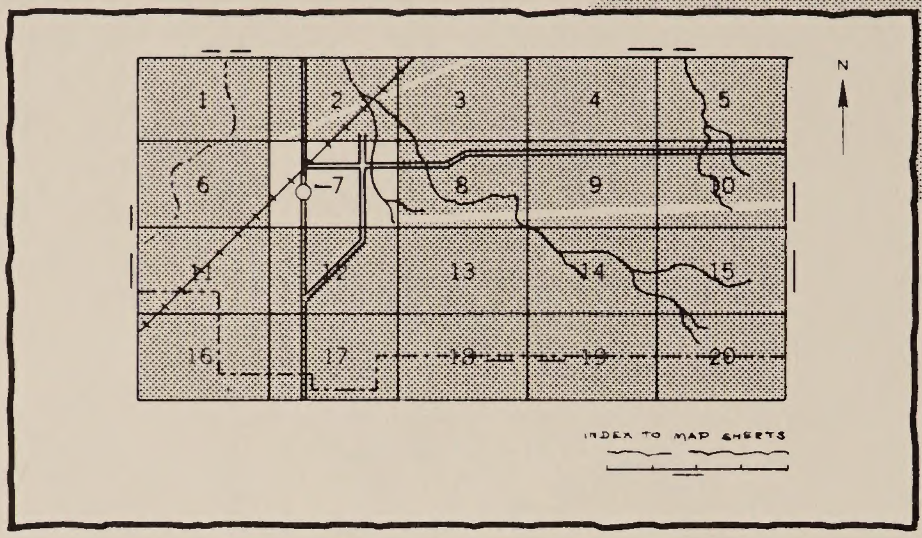
Soil
Conservation
Service

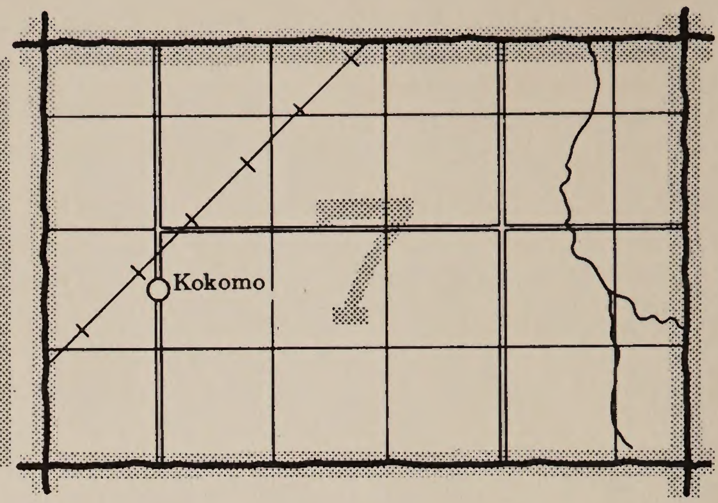
In cooperation with
United States Department of Agriculture, Forest Service;
United States Department of the Interior, Bureau of Land Management and Bureau of Indian Affairs; and
University of Nevada Agricultural Experiment Station

Soil Survey of Washoe County, Nevada, South Part

HOW TO USE

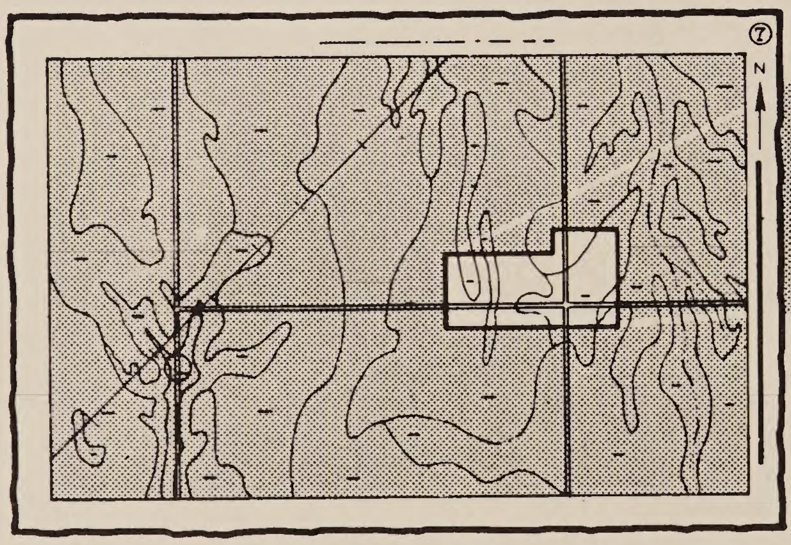
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

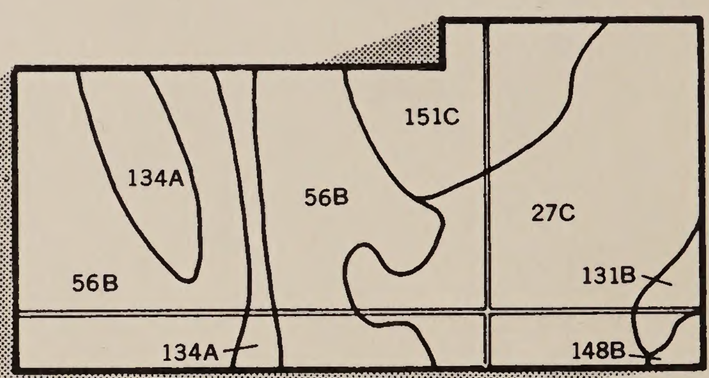




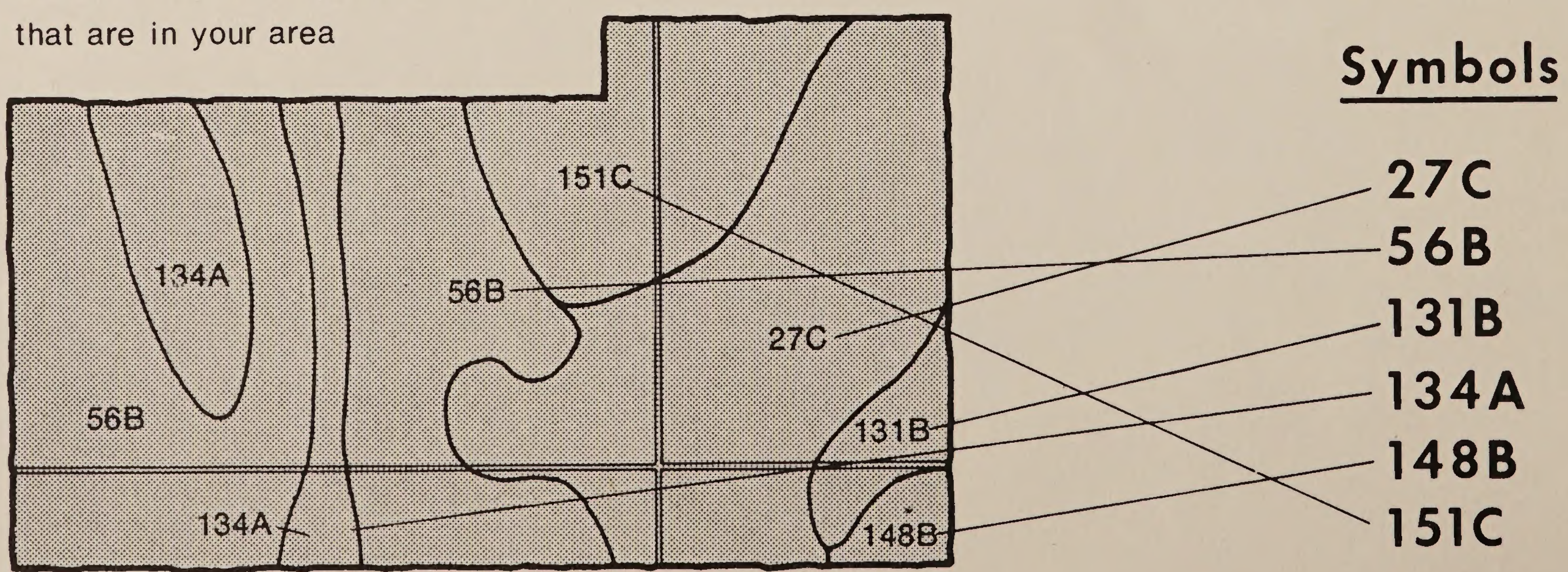
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



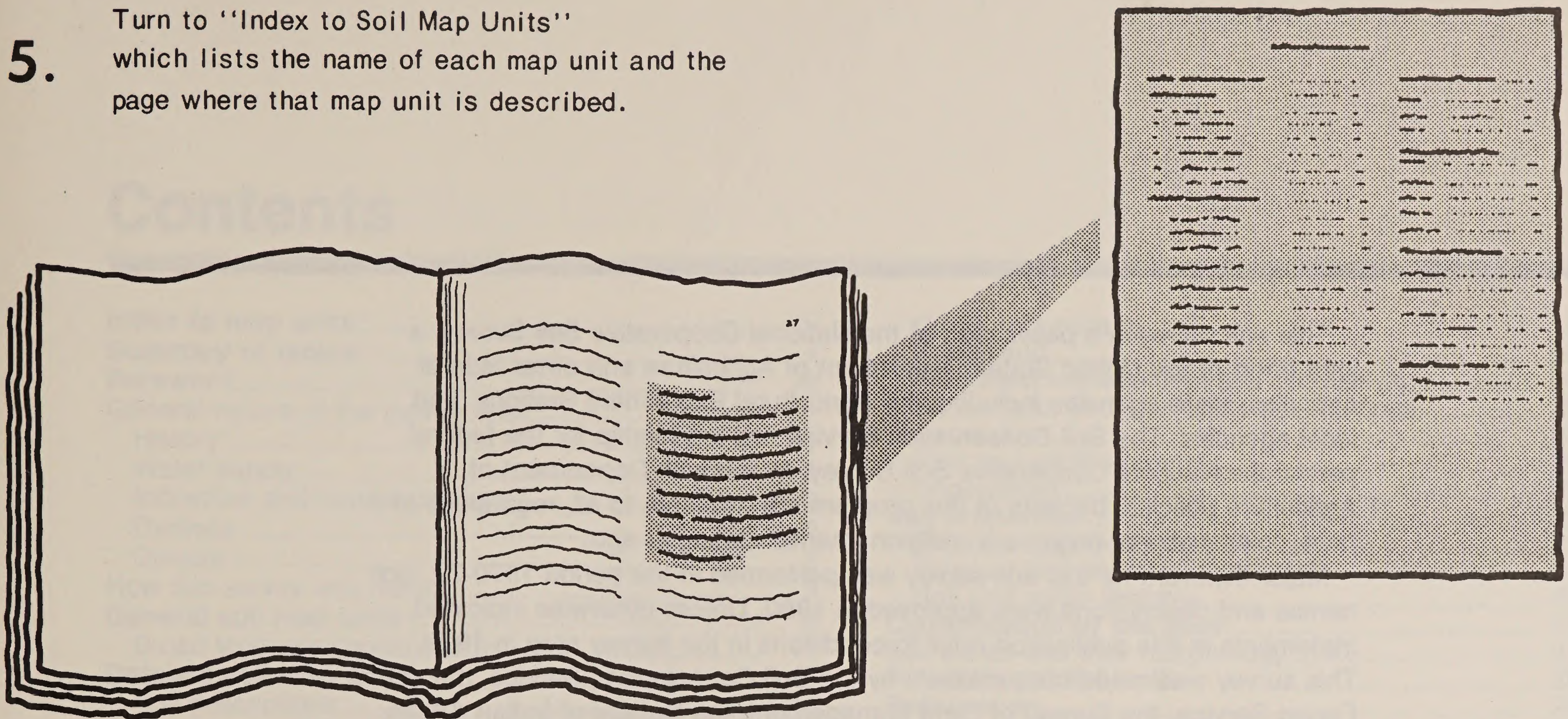


4. List the map unit symbols that are in your area

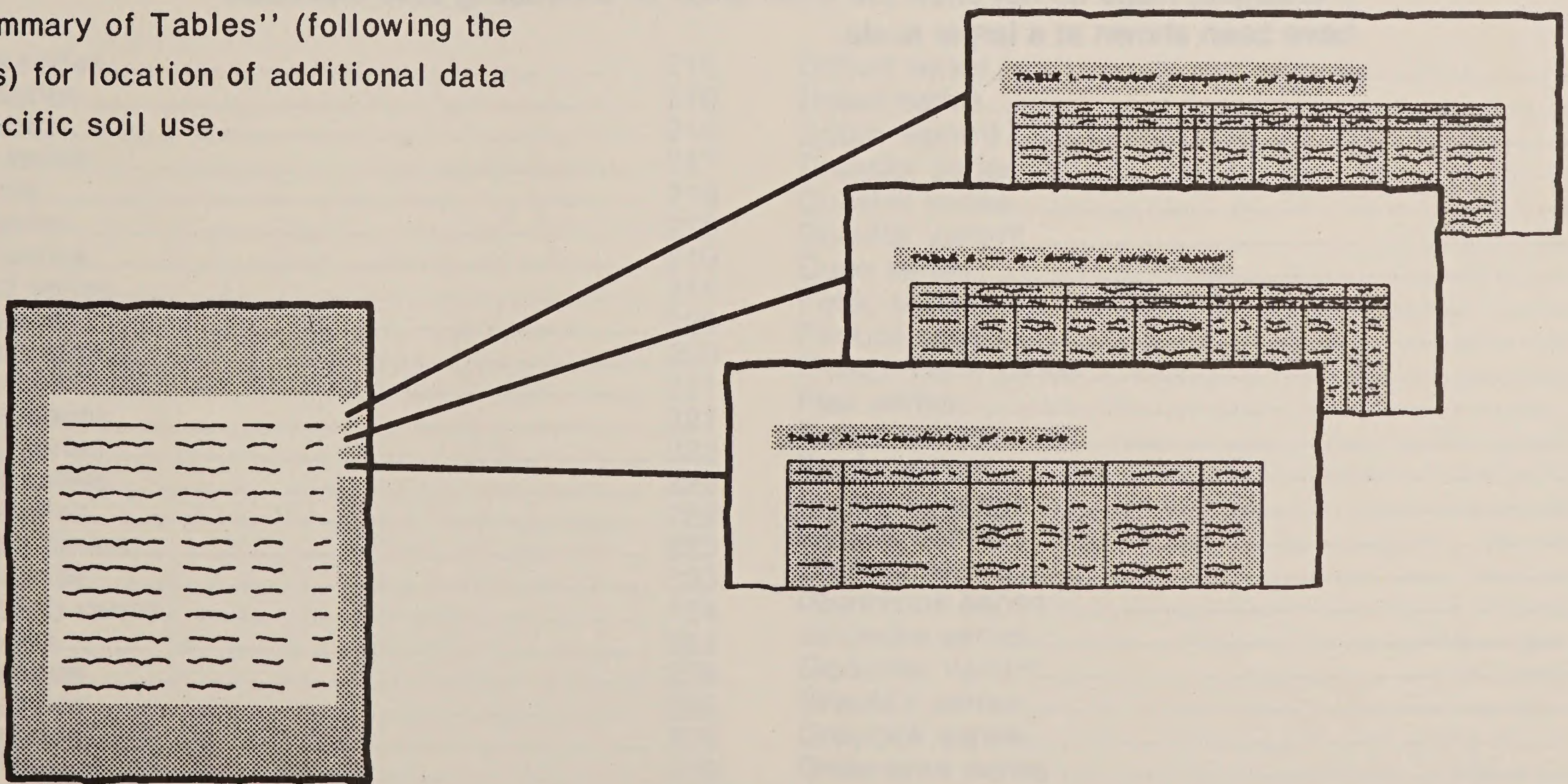


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1970-79. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, and the University of Nevada Agricultural Experiment Station. It is part of the technical assistance furnished to the Washoe-Storey Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Soil Series

Issued August 1983

Index to Map Units

Summary of Tables

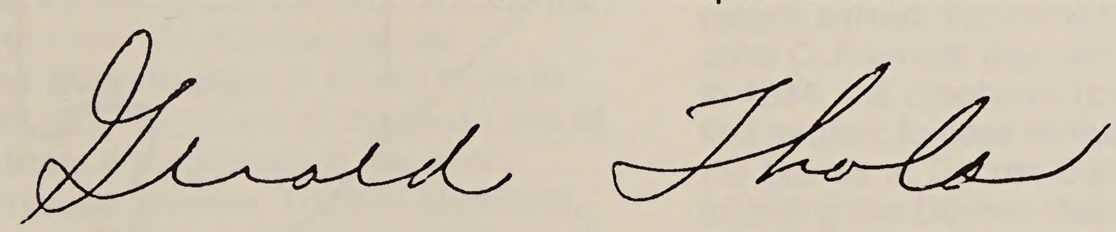
Foreword

This soil survey contains information that can be used in land-planning programs in Washoe County, Nevada, South Part. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

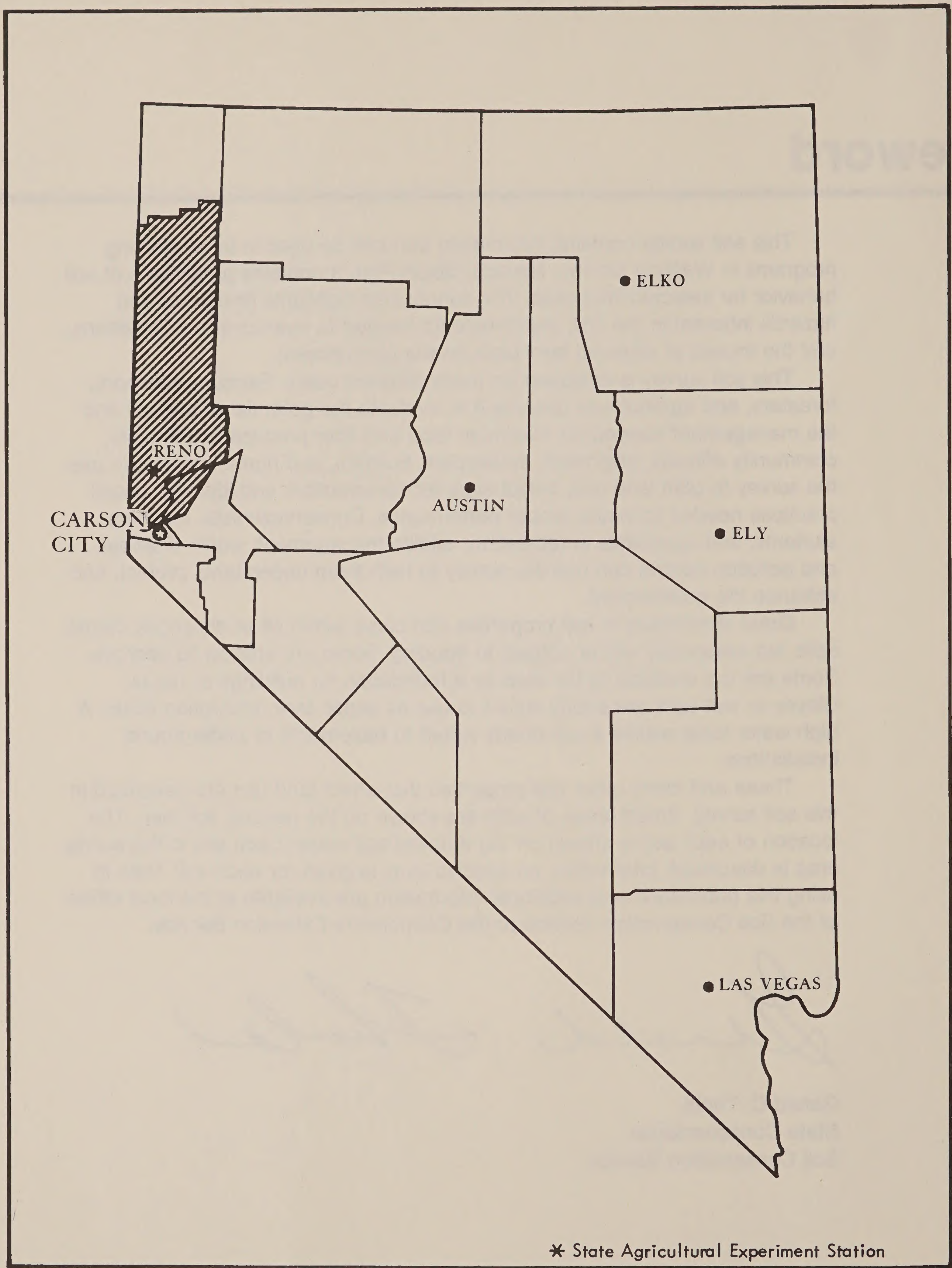
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.



Gerald C. Thola
State Conservationist
Soil Conservation Service



Location of Washoe County, South Part, in Nevada.

Soil Survey of Washoe County, Nevada, South Part

By Otto W. Baumer, Soil Conservation Service

Fieldwork by Otto W. Baumer, William E. Dollarhide, Leland I. Larsen, Edward W. Blake, Carole E. Jett, and John F. Fisher, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with the United States Department of Agriculture, Forest Service; the United States Department of the Interior, Bureau of Land Management and Bureau of Indian Affairs; and the University of Nevada Agricultural Experiment Station

WASHOE COUNTY, NEVADA, SOUTH PART, has a total land area of about 986,560 acres, or 1,542 square miles. Reno and Sparks are the largest cities in the survey area. Small towns in the area include Verdi, Washoe City, Bordertown, Nixon, Stead, and settlements or developments in almost all the valleys.

The survey area is located in the western fringe of the Basin and Range physiographic province. Numerous mountain ranges and intermountain valleys dominate the landscape. The Carson and Virginia Ranges are prominent in the area. The elevation of Mount Rose in the Carson Range at 10,778 feet and of Pyramid Lake at about 3,800 feet indicate the extremes in elevation. Valleys and basins include Washoe, Truckee Meadows, Spanish Springs, Hungry Valley, and Lemmon Valley. Landforms in the valleys include flood plains, alluvial fans, terraces, pediments, dunes, and playas. The mountains characteristically rise 2,000 to 4,000 feet above adjacent valleys.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent counties. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey.

General Nature of the Survey Area

Richard MacDougall, district conservationist, Soil Conservation Service, helped write this section.

History

The survey area was inhabited by the Northern Nevada Paiute Indian Nation when the first explorers on record arrived. Exploring the area in 1843 and 1844, John C. Fremont discovered and named Pyramid Lake. In 1844, the Stephans-Townsend-Murphy group were the first settlers to pass through the survey area and cross the Sierras at Donner Summit. For over a decade following the Donner-Reed party tragedy in 1846, settlers arriving too late in the season to cross the Sierra Nevada spent the winter in the Truckee Meadows.

Permanent settlement began in 1852 when "Jamison's Station" was established near the present site of the Reno-Sparks sewage plant. Early settlers cut wild hay or raised wheat to support migration to the California gold fields, mining along the Comstock lode, and, in the 1860's, the construction of the Central Pacific Railroad east and west of Reno.

Early development of the area was based on the production of livestock and crops. Irrigation, introduced

in the late 1850's, brought a greater variety of crops—barley, oats, potatoes, vegetables, apples, peaches, plums, and berries.

Logging to supply timber for the Virginia City mines and firewood for Reno became important after the now abandoned Virginia and Truckee Railroad line was built between Reno and Virginia City. Logging has long since declined and currently accounts for a very minor part of the local economy.

In the early days, the railroad was very significant to the economy of the survey area. Huffaker's Station became a point of shipment for agricultural products and for the large amounts of timber and stovewood that were flumed down from the mountains to the west. With the decline of the Comstock lode, the railroad became less important and the economy of the area settled back to the true wealth of the region—the fertile meadowlands and abundant water supply. Farming and ranching continued to be the principal economic activities for many years. Since World War II, the growth of Reno and Sparks has resulted in the conversion of agricultural lands to subdivision and rural residential uses.

Water Supply

The major sources of irrigation water in the survey area are the Truckee River, Franktown Creek, Ophir Creek, Browns Creek, Galena Creek, Steamboat Creek, Whites Creek, and Thomas Creek. Wells have been drilled to supplement surface flow so that agriculture could expand into new areas such as Warm Springs Valley.

In the rural and suburban areas, water for household use is obtained from wells. Reno and Sparks and part of the adjacent county receive primarily treated water from the Truckee River. Small streams and deep wells also provide some water. A few outlying developed areas are supplied by private water companies that serve a few to several hundred customers.

The quality of the ground water is highly variable, and in some areas high levels of salts or toxic minerals make ground water unsuitable for household use.

Industries and Transportation

The main industries in the area are gaming-tourism, warehousing, agriculture, and light industry.

The economic base in the survey area is tourism, especially casino gaming and the complex of hotels, motels, and restaurants that supports the gaming industry. There is also some outdoor tourist activity, most notably skiing in the winter.

Of secondary importance is the warehouse industry, which has developed both because of the area's central location with respect to west coast markets and because of Nevada's "free port law", which exempts from taxation goods that are stored in the state.

Agriculture was once extensive in the meadows near the Truckee River but has declined greatly as a result of the growth of Reno and Sparks. Today, most farming is done on the fringes of the Truckee Meadows or in outlying valleys. In most of the sparsely populated outlying areas, the dominant agricultural activities are raising beef cattle and irrigated farming.

Light industries in the survey area are many and varied. They include manufacturing facilities for valves and regulators, skis, dog food, and gaming equipment.

The area is served by the Southern Pacific and Western Pacific Railroads. The Southern Pacific traverses the survey area east to west, paralleling the Truckee River. The Western Pacific runs from Reno to Sparks and connects with its main line in the vicinity of Hallelujah Junction. The two principal highways in the survey area are Interstate 80 running east to west, and U.S. 395 (I-580) running north to south. State highways and local all-weather roads provide ready access to nearly all sections of the survey area except the rugged mountainous reaches.

Major airlines provide regular scheduled service to the Cannon International Airport at Reno.

Geology

The geology of the survey area is variable and complex.

Most outcrops of pre-Tertiary rock in this area consist of plutonic rocks that range in composition from gabbro to quartz monzonite. The composition in most exposed intrusive masses approximates granodiorite. Typical soils that formed in parent material derived from these rocks are Acrelane, Corbett, and Witefels soils.

The metamorphic rock in the area includes both metasedimentary and metavolcanic rocks. These are the oldest rocks in the area and are mostly Jurassic in age. Flex soils formed in material derived from these rocks.

The volcanic rock in this area includes welded ash-flow tuffs, andesite flows, basalt, basaltic andesite, and other tuffs. These are part of the Hartford assemblage and range in age from early Miocene to early Pleistocene. These rocks are the most extensive in the area. The soils that formed in these materials include Arzo, Stingdorn, and Frodo soils.

The oldest valley fill is sediment of Tertiary age along the Truckee River and in Hungry Valley and Warm Springs Valley. It is mostly fluviolacustrine diatomite, siltstone, and tuff. These deposits are generally known as Coal Valley Formation. Soils such as Celeton Variant and Verdico soils formed in this sediment.

Many fans and terraces in the area are made up of older Quaternary alluvium. This alluvium is parent material for soils such as those of the Greenbrae, Godecke, and Bedell series.

The youngest material in the area is recent alluvium

along the flood plains of the Truckee River and streams in the area. Typical soils that formed in this material are those of the Notus, Voltaire, and Truckee series.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

In Washoe County summers are hot, especially at lower elevations, and winters are cold. At lower elevations, precipitation is normally light during all months of the year, and land is mainly used for range. At higher elevations, precipitation is much greater and snow accumulates to considerable depths. Much of the snowmelt irrigates crops in nearby valleys.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Nixon, Reno, and Virginia City in the period 1951 to 1975. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 34 degrees F, and the average daily minimum temperature is 23 degrees. The lowest temperature on record, which occurred at Nixon on December 9, 1972, is 22 degrees. In summer the average temperature is 68 degrees, and the average daily maximum temperature is 80 degrees at Virginia City and 89 degrees at Nixon. The highest recorded temperature, which occurred at Nixon on August 8, l972, is 106 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, about 3 inches, or 30 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 2 inches. The heaviest 1-day rainfall during the period of record was 2.18 inches at Virginia City on January 20, 1969. Thunderstorms occur on about 13 days each year, and most occur in summer.

Average seasonal snowfall is 32 inches. The greatest snow depth at any one time during the period of record was 49 inches at Virginia City. On an average, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year. Every few years a blizzard strikes the survey area with high winds and much drifting snow. Even at lower elevations, snow remains on the ground for many weeks and livestock suffer.

The average relative humidity in midafternoon is about 30 percent. Humidity is higher at night, and the average at dawn is about 55 percent. The sun shines 90 percent of the time possible in summer and 70 percent in winter. The prevailing wind is from the west-northwest. Average windspeed is highest, 8 miles per hour, in April.

How This Survey Was Made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General Soil Map Units" and "Detailed Soil Map Units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, rangeland and woodland managers, engineers, planners, developers and builders, home buyers, and others.

A number of map units in this survey area have soil names different from those in adjoining soil survey areas. The names in the Tahoe National Forest Area differ primarily because the soils in the two survey areas have small differences in base saturation, bulk density, organic matter, or other soil properties that affect the

classification of the soil. As a result of these small differences, soils that are in closely related families and are similar in use and management have been given different names. Some names in this survey differ from names in the Tahoe Basin Area because some soils have been reclassified since the Tahoe Basin Area was surveyed. The use and management are essentially the same. The Sierra Valley Area, California, and the Fallon-Fernley Area are older soil surveys, and the design of the map units for the intended use and management was different. Names in this survey and in the Carson City Area differ only where the proportion of soils in a unit changes near the survey boundary so that a named component in one area is only an inclusion in the other

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The eighteen map units in this survey area are grouped into six general kinds of landscapes for broad interpretive purposes. Each broad group and the map units in each group are described in the following pages.

Areas dominated by soils on flood plains and low terraces

Two map units are in this group. The soils in this group are on flood plains of rivers and streams, low terraces, and enclosed basins. Elevation is 3,800 to 5,200 feet. The average annual precipitation is 8 to 12 inches. The average annual air temperature is 47 to 52 degrees F, and the frost-free period is about 90 to 130 days.

These soils are nearly level. Most are very deep, but some are moderately deep. These soils are fine textured to moderately coarse textured throughout.

Most of the soils in this group have a seasonal high water table and are subject to rare flooding. Some of these soils, however, have a water table between 6 and 7 feet, and some are not subject to flooding.

1. Truckee-Voltaire-Vamp

Nearly level, very deep and moderately deep, very poorly drained to somewhat poorly drained soils; on alluvial fans, flood plains, and low terraces

This map unit is mainly in the western part of the survey area along the Truckee River, in the Truckee meadows, and on the western side of Washoe Valley. The vegetation is mainly sedges and other water-tolerant plants on the reclaimed areas and is saltgrass, rubber rabbitbrush, and black greasewood on the areas affected by salt and alkali. This unit makes up about 4 percent of the survey area.

The very deep Truckee soils are on flood plains. They formed under poorly drained conditions. The drainage has been altered. These soils are medium textured and moderately fine textured throughout. They are subject to rare flooding. They are nonsaline-alkali to strongly saline-alkali.

The very deep Voltaire soils are on alluvial fans and flood plains. They formed under poorly drained and very poorly drained conditions. The drainage has been altered in most of the area. These soils are moderately fine textured throughout. They are subject to rare flooding. They are nonsaline-alkali to strongly saline-alkali.

The moderately deep Vamp soils are on flood plains and low terraces and are somewhat poorly drained. These soils have a hardpan at a depth of 20 to 40 inches. They are moderately coarse textured above the hardpan. They are subject to rare flooding. They are slightly saline-alkali to strongly saline-alkali.

Of minor extent in this unit are Jubilee, Dressler, Settlemeyer, Sagouspe, Rose Creek, Idlewild, Updike, and Fleischmann soils. The Dressler, Jubilee, Sagouspe, Settlemeyer, and Rose Creek soils are on landscapes similar to those the major soils are on. The Idlewild and Updike soils are on slightly higher terraces and have a clayey subsoil. The Fleischmann soils are on high terrace remnants and are well drained.

This unit is used mainly for urban development, crops, pasture, and wildlife habitat.

The main limitations for urban development are flooding and the high water table. The main limitations for crops, pasture, and openland wildlife habitat are the high water table and salt and alkali. Use of the unit for wetland wildlife habitat is limited in areas where the water table has been lowered as a result of altered drainage.

2. Mellor-Updike-Godecke

Nearly level, very deep, somewhat poorly drained and moderately well drained soils; on low terraces and low-lying alluvial fans

This map unit is mainly in valleys in the western part of the survey area. The vegetation is mainly black

greasewood, saltgrass, shadscale, basin wildrye, and rubber rabbitbrush. This unit makes up about 3 percent of the survey area.

The moderately well drained Mellor soils are on low lake terraces and low-lying alluvial fans. These soils have a medium textured surface layer and a moderately fine textured subsoil. They are strongly saline-alkali in the lower part.

The moderately well drained Updike soils are on low lake terraces. These soils have a medium textured surface layer and a fine textured subsoil. They are moderately saline-alkali.

The somewhat poorly drained Godecke soils are on low terraces. These soils have a moderately coarse textured surface layer and a moderately fine textured subsoil. They are slightly to moderately saline-alkali.

Of minor extent in this unit are Doten, Dalzell, Parran, Cradlebaugh, Sagouspe, and Jowec soils and Playas. The Doten, Dalzell, and Jowec soils are on landscapes similar to those of the major soils. The Cradlebaugh and Sagouspe soils are on low-lying alluvial fans and flood plains. These soils have a seasonal high water table and are subject to flooding. The Parran soils and Playas are in basins.

This unit is used mainly for urban development and wildlife habitat.

The main limitations for urban development are the high clay content of most of the soils and the high water table. The main limitation to use as pasture is the salt and alkali content of the soils.

Areas dominated by dry soils on alluvial fans and terraces

Three map units are in this group. Most of the soils in this group are on alluvial fans and terraces in the eastern part of the survey area. Elevation is 3,800 to 6,000 feet. The average annual precipitation is 4 to 8 inches, the average annual temperature is 49 to 54 degrees F, and the frost-free period is about 100 to 130 days.

These soils are well drained to excessively drained and are shallow to very deep. They are nearly level to strongly sloping.

3. Isolde-Ruhe-Trocken

Nearly level to moderately steep, shallow and very deep, excessively drained and well drained soils; on sand dunes, lake terraces, and alluvial fans

This map unit is mostly in valleys in the eastern part of the survey area. The vegetation is mainly hairy horsebrush, winterfat, Bailey greasewood, and Indian ricegrass. This unit makes up about 5 percent of the survey area.

The nearly level to strongly sloping, excessively drained Isolde soils are on sand dunes. These soils are very deep and are coarse textured throughout. In some areas, these soils are underlain by silty lake deposits in the substratum.

The nearly level to strongly sloping, well drained Ruhe soils are on lake terraces. These soils are shallow over a tufa layer and are coarse textured.

The gently sloping to moderately steep, well drained Trocken soils are on alluvial fans. These soils are very deep, are moderately coarse textured, and are very gravelly throughout.

Of minor extent in this unit are Toulon soils, Bango soils, Duneland, and Beaches. The Toulon and Bango soils are on lake terraces.

This unit is mainly used as rangeland and for wildlife habitat. The main limitation for these uses is the very low precipitation.

4. Hawsley-Bluewing-Stumble

Gently sloping to strongly sloping, very deep, excessively drained and somewhat excessively drained soils; on alluvial fans and terraces

This map unit is mostly in valleys in the eastern part of the survey area. The vegetation is mainly Bailey greasewood, shadscale, bud sagebrush, and Indian ricegrass. This unit makes up about 4 percent of the survey area.

The gently sloping to moderately sloping, somewhat excessively drained Hawsley soils are on alluvial fans and terraces. These soils are very deep and are coarse textured throughout.

The gently sloping to strongly sloping, excessively drained Bluewing soils are on alluvial fans. These soils are very deep and are coarse textured and very gravelly throughout.

The moderately sloping to strongly sloping, somewhat excessively drained Stumble soils are on alluvial fans. These soils are very deep and are coarse textured throughout.

Of minor extent in this unit are Bango and Biddleman soils. The Bango and Biddleman soils are on lake terraces and have moderately fine textured subsoils.

This unit is used mainly as rangeland and for rangeland wildlife habitat. The main limitation for these uses is the very low precipitation.

5. Bundorf-Sutcliff-Rednik

Moderately sloping to strongly sloping, shallow to very deep, well drained soils; on dissected alluvial fans

This map unit is mostly in the valleys in the eastern part of the survey area. The vegetation is mainly bud sagebrush, Bailey greasewood, shadscale, and Indian ricegrass. This unit makes up about 2 percent of the survey area.

The Bundorf soils are shallow over a hardpan. They are medium textured in the surface layer and fine textured in the subsoil.

The Sutcliff soils are deep over a hardpan. They are medium textured in the surface layer. The subsoil is moderately fine textured and is very cobbly or stony.

The Rednik soils are very deep. They are moderately coarse textured in the surface layer, moderately fine textured in the subsoil, and coarse textured in the substratum. These soils are very gravelly throughout.

Of minor extent in this unit are Kleinbush, Washoe, and Bango soils. The Kleinbush soils are on tops of alluvial fan remnants and have a fine textured subsoil. The Washoe soils are near drainageways. The Bango soils are on terraces adjacent to small playas.

This unit is used mainly as rangeland and for rangeland wildlife habitat. The main limitation for these uses is the very low precipitation.

Areas dominated by partially moist soils on alluvial fans and terraces

Three map units are in this group. Most of the soils in this group are on alluvial fans and terraces in the central part of the survey area. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 8 to 12 inches, the average annual temperature is 45 to 50 degrees F, and the frost-free period is about 90 to 110 days.

These soils are well drained to excessively drained and are shallow to very deep. Slopes are nearly level to steep.

6. Haybourne-Wedertz-Mottsville

Nearly level to strongly sloping, very deep, well drained and excessively drained soils; on alluvial fans and terraces

This map unit is mostly in the central valleys of the survey area. The vegetation is mainly big sagebrush, antelope bitterbrush, Anderson peachbrush, and Indian ricegrass. This unit makes up about 8 percent of the survey area.

The gently sloping to strongly sloping, well drained Haybourne soils are on alluvial fans. These soils are very deep. They have a coarse textured surface layer, a moderately coarse textured subsoil, and a coarse or moderately coarse textured substratum.

The gently sloping to moderately sloping, well drained Wedertz soils are on alluvial fans and terraces. These soils are very deep. They have a moderately coarse and coarse textured surface layer, a moderately fine textured subsoil, and weak silica cementation below the subsoil.

The nearly level to strongly sloping, excessively drained Mottsville soils are on alluvial fans. These soils are very deep and are coarse textured throughout.

Of minor extent in this unit are Linhart, Incy, Bedell, Aladshi, and Kayo soils. The Linhart soils are on inset alluvial fans, the Bedell soils are on alluvial fans, and the Incy soils are on sand dunes. The Aladshi and Kayo soils are on west-facing alluvial fans along the eastern edge of this map unit.

This unit is used mainly for urban development, rangeland, limited crop production, and wildlife habitat.

The main limitation for urban development is flash-flooding during storms of unusually high intensity. The main limitations to use as rangeland and for rangeland wildlife habitat are the low available water capacity of the soils and low precipitation. The main limitation to use as cropland is the lack of water for irrigation and the low available water capacity of the soils.

7. Reno-Galeppi-Chalco

Gently sloping to steep, shallow to very deep, well drained soils; on dissected alluvial fans, terraces, and pediments

This map unit is mostly in the higher parts of the central and western valleys and along the Truckee River drainage system. The vegetation is mostly low sagebrush, big sagebrush, and Thurber needlegrass. This unit makes up about 13 percent of the survey area.

The gently sloping to strongly sloping Reno soils are on terraces and pediments. These soils are moderately deep over a hardpan. They are moderately coarse textured in the surface layer and are fine textured in the subsoil over the hardpan.

The moderately sloping to moderately steep Galeppi soils are on dissected alluvial fans and terraces. These soils are very deep. The surface layer is moderately coarse textured, the subsoil is moderately fine textured, and the substratum has weak silica cementation.

The moderately sloping to strongly sloping Chalco soils are on the tops of pediments, and the moderately steep to steep Chalco soils are on pediment backslopes. These soils are shallow over soft bedrock. The surface layer is medium textured or moderately fine textured, and the subsoil is fine textured.

Of minor extent in this unit are Cassiro, Barnard, Aquinas, Greenbrae, Waspo, Stodick, Arzo, and Celeton Variant soils and Badland. The Cassiro and Barnard soils are on high-lying alluvial fans and terraces. The Aquinas and Greenbrae soils are on alluvial fans and terraces near granitic hills. The Waspo and Stodick soils are on pediments. The Arzo soils are on low-lying hills. The Celeton Variant soils and Badland are on eroding areas of pediments.

This unit is used mainly for urban development, rangeland, and wildlife habitat.

The main limitations for urban development are the high clay content and the restricted depth to bedrock or a hardpan. The main limitation to use as rangeland and for rangeland wildlife habitat is the low and moderately low precipitation.

8. Oest-Orr-Leviathan

Nearly level to steep, very deep, well drained soils; on alluvial fans and terraces

This map unit is mostly in the valleys of the western part of the survey area and along the terraces of the Truckee River. The vegetation is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. This unit makes up about 3 percent of the survey area.

The Oest soils are on nearly level to moderately sloping tops of terraces, steep side slopes of terraces, and moderately sloping to moderately steep alluvial fans. These soils have a moderately coarse textured and medium textured surface layer, a moderately fine textured subsoil, and a moderately coarse textured to coarse textured substratum. They are very gravelly throughout.

The Orr soils are on nearly level to moderately sloping alluvial fans and terraces. These soils have a moderately coarse textured surface layer and a moderately fine textured subsoil. The texture of the substratum is variable.

The Leviathan soils are on nearly level to moderately sloping tops of terraces and moderately steep and steep side slopes. These soils have a moderately coarse textured surface layer and a moderately fine textured subsoil. They are very gravelly or very cobbly throughout.

Of minor extent in this unit are Fleischmann, Holbrook, Springmeyer, and Bieber soils. The Fleischmann, Springmeyer, and Bieber soils are on terraces. The Fleischmann and Bieber soils have a hardpan. The Holbrook soils are near drainageways.

This unit is mainly used for urban development, crops, irrigated pasture, rangeland, and wildlife habitat.

These soils are relatively well suited to use for urban development. Many areas of these soils, however, are near live streams. Water supplies can be contaminated because the substratum or the material below the substratum is rapidly permeable. The Orr soils are suited to irrigated crops and openland wildlife habitat where water is available. The moderately low precipitation is a limitation to use as rangeland and for rangeland wildlife habitat.

Areas dominated by dry soils on foothills and low hills

One map unit is in this group. The soils in this group are on uplands in the foothills in the eastern part of the survey area. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 4 to 8 inches, the average annual temperature is 48 to 52 degrees F, and the frost-free period is about 100 to 120 days.

These soils are well drained to somewhat excessively drained, very shallow to deep, and strongly sloping to steep.

9. Osobb-Singatse-Fireball

Strongly sloping to steep, very shallow to deep, well drained and somewhat excessively drained soils; on uplands

This map unit is mostly in the eastern part of the survey area. The vegetation is mainly bud sagebrush, Bailey greasewood, shadscale, and Indian ricegrass. This unit makes up about 8 percent of the survey area.

The strongly sloping to steep, well drained Osobb soils are on uplands in foothills. These soils are shallow and have a hardpan over bedrock. They are medium textured to moderately coarse textured and are very gravelly throughout.

The strongly sloping to moderately steep, somewhat excessively drained Singatse soils are on eroded slopes of uplands. These soils are very shallow over bedrock. They are moderately coarse textured or medium textured and are very gravelly throughout.

The steep, well drained Fireball soils are on colluvial upland slopes. These soils are deep over bedrock. They are moderately coarse textured in the surface layer and medium textured in the subsoil and are very gravelly or very cobbly throughout.

Of minor extent in this unit are the Rezave, Pirouette, Hefed, Bombadil, and Trocken soils and Rock outcrop. The Rezave and Pirouette soils are on basalt plateaus. The Hefed soils are on north-facing colluvial slopes. The Trocken soils are on alluvial fans in canyon bottoms. The Bombadil soils are on north- and east-facing slopes.

This unit is mainly used as rangeland and for rangeland wildlife habitat. The main limitation for these uses is very low precipitation.

Areas dominated by partially moist soils on foothills and low hills

Three map units are in this group. The soils in this group are on uplands in the central part of the survey area. Elevation is 4,400 to 6,500 feet. The average annual precipitation is 8 to 12 inches, the average annual temperature is 47 to 50 degrees F, and the frost-free period is about 80 to 110 days.

These soils are well drained to somewhat excessively drained, very shallow to moderately deep, and moderately sloping to very steep.

10. Acrelane-Graufels-Glenbrook

Moderately sloping to very steep, shallow and moderately deep, well drained and somewhat excessively drained soils; on granitic uplands

This map unit is mostly in the western and central foothills and low mountain ranges of the survey area. The vegetation is mainly big sagebrush, antelope bitterbrush, bottlebrush squirreltail, and some scattered juniper. This unit makes up about 10 percent of the survey area.

The strongly sloping to steep, well drained Acrelane soils are on foothills and low mountainous uplands. These soils are shallow over granitic bedrock. They are moderately coarse textured in the surface layer and

moderately fine textured in the subsoil above the bedrock. They are very gravelly throughout.

The moderately sloping to steep, somewhat excessively drained Graufels soils are on foothills and low mountainous uplands. These soils are moderately deep over granitic bedrock and are coarse textured throughout.

The moderately sloping to very steep, somewhat excessively drained Glenbrook soils are on foothills and low mountainous uplands. These soils are shallow over granitic bedrock and are coarse textured throughout.

Of minor extent in this unit are Haypress, Luppino, Surgem, Tanob, and Calpin soils and Rock outcrop. The Haypress and Tanob soils are on mountains at higher elevations. The Luppino soils are on pediments. The Surgem soils are on lower slopes. The Calpin soils are on small alluvial fans.

This unit is used mainly for urban development, rangeland, and rangeland wildlife habitat.

The main limitations for urban development are steepness of slope and the restricted depth of the soils over bedrock. The main limitation to use as rangeland and for rangeland wildlife habitat is the low and moderately low precipitation.

11. Indiano-Flex-Koontz

Strongly sloping to steep, very shallow to moderately deep, well drained soils; on uplands

This map unit is mostly in the western and central parts of the survey area on hills and low mountains. The vegetation is mainly big sagebrush, antelope bitterbrush, green ephedra, cheatgrass, and some scattered juniper. This unit makes up about 5 percent of the survey area.

The moderately steep to steep Indiano soils are on low mountainous uplands. These soils are moderately deep over altered volcanic rocks. They are moderately coarse textured and medium textured in the surface layer and moderately fine textured in the subsoil.

The strongly sloping to steep Flex soils are on low mountainous uplands. These soils are very shallow over weathered metavolcanic rock. They are moderately coarse textured in the surface layer and moderately fine textured in the subsoil and are very gravelly throughout.

The strongly sloping to steep Koontz soils are on mountainous uplands. These soils are shallow over weathered metavolcanic rock. They are medium textured in the surface layer and moderately fine textured in the subsoil.

Of minor extent in this unit are Wedekind, Mizel, and Yuko soils. The Wedekind and Yuko soils are on upland slopes similar to those of the major soils. The Yuko soils are very shallow. The Mizel soils are very shallow and are on eroded, rounded ridges and tops.

This unit is used mainly as rangeland and for rangeland wildlife habitat. The main limitations for these uses are the low and moderately low precipitation and the low available water capacity.

12. Xman-Duco-Old Camp

Moderately sloping to steep, shallow, well drained soils; on uplands

This map unit is mostly in the central foothills and low mountain ranges. The vegetation is mainly low sagebrush, big sagebrush, bottlebrush squirreltail, and scattered groves of juniper. This unit makes up about 23 percent of the survey area.

The moderately sloping to steep Xman soils are on foothills and low mountainous uplands. These soils have a moderately coarse textured and medium textured surface layer and a fine textured subsoil.

The moderately steep to steep Duco soils are on ridges. These soils have a moderately coarse textured surface layer and a moderately fine textured subsoil. They are very gravelly or very cobbly throughout.

The strongly sloping to steep Old Camp soils are on foothills and low mountainous uplands. These soils have a moderately coarse textured surface layer and a very cobbly moderately fine textured subsoil.

Of minor extent in this unit are McQuarrie, Tristan, Mizel, Arzo, Risley, Cagle, Frodo, and Smallcone soils and Rock outcrop. The McQuarrie and Tristan soils are in positions on uplands similar to those of the major soils. The Arzo soils are on lower slopes. The Mizel soils are on eroded slopes and rounded hills. The Frodo soils are on remnant plateaus. The Cagle soils are only in the Virginia Range and support pinyon pine. The Smallcone soils are on eroded slopes of acid rocks in the Virginia Range and support sparse stands of Jeffrey pine.

This unit is used mainly as rangeland and for rangeland wildlife habitat. The main limitations for these uses are the steepness of the slopes and the low and moderately low precipitation.

Areas dominated by soils on high mountains

Six map units are in this group. The soils in this group are on high mountainous uplands in the central part of the area and on the eastern slopes of the Sierras in the western side of the survey area. Elevation is 5,500 to 10,000 feet. The average annual precipitation is 14 to 50 inches, the average annual temperature is 40 to 45 degrees F, and the frost-free period is 30 to 90 days.

These soils are well drained to excessively drained, shallow to very deep, and moderately sloping to very steep.

13. Softscrabble-Gabica-Sumine

Strongly sloping to steep, shallow to very deep, well drained soils; on uplands

This map unit is mostly in the western, central, and northern parts of the survey area on mountainous uplands. The vegetation is mainly big sagebrush, low sagebrush, antelope bitterbrush, lupine, Idaho fescue,

and muleears. This unit makes up about 1 percent of the survey area.

The moderately steep to steep Softscrabble soils are on slightly concave mountainous uplands. These soils are very deep. They are medium textured in the surface layer and moderately fine textured and very gravelly or cobbly in the subsoil.

The strongly sloping to moderately steep Gabica soils are on ridges on mountainous uplands. These soils are shallow over hard bedrock. They are moderately coarse textured in the surface layer and moderately fine textured in the subsoil and are very gravelly or very cobbly throughout.

The steep Sumine soils are on mountainous uplands. These soils are moderately deep. They are medium textured in the surface layer and moderately fine textured in the subsoil and are very gravelly or very cobbly throughout.

Of minor extent in this unit are Mosquet, Thulepah, and Ticino soils and Rock outcrop. The Mosquet and Thulepah soils are at the highest elevations. The Ticino soils support mountainmahogany.

This unit is used mainly as rangeland and is suited to rangeland wildlife habitat. The main limitation for these uses is the cold spring temperatures. The shallow root zone and the very low available water capacity of the Gabica soil are also limitations.

14. Fraval-Booford-Jumbo

Strongly sloping to steep, moderately deep and deep, well drained soils; on mountainous uplands

This map unit is mostly on the lower slopes of the Sierra Nevada Mountains in the western part of the survey area. The vegetation is mainly Jeffrey pine, big sagebrush, antelope bitterbrush, and some mountainmahogany. This unit makes up about 3 percent of the survey area.

The steep Fraval soils are on mountainous uplands. These soils are moderately deep over tuff. They are medium textured in the surface layer and medium textured or moderately fine textured in the subsoil and are very gravelly.

The strongly sloping to steep Booford soils are on the lower slopes of mountains. These soils are moderately deep over weathered bedrock. They are medium textured in the surface layer and fine textured in the subsoil.

The steep Jumbo soils are on colluvial mountain slopes. These soils are deep over tuff. They are medium textured in the surface layer and medium or moderately fine textured in the subsoil and are very cobbly.

Of minor extent in this unit are Apmat, Duckhill, Duckhill Variant, Inville Variant, and Barshaad soils. The Apmat soils are on alluvial fans. The Inville Variant soils are on terrace and glacial outwash remnants. The Duckhill soils are on eroded side slopes, and the Duckhill Variant soils are on ridges. The Barshaad soils are on plateaus and ridgetops.

This unit is used mainly as woodland and rangeland and for wildlife habitat.

The main limitation to use as woodland and for woodland wildlife habitat is the marginal precipitation. The main limitations to use as rangeland are the steepness of slopes and the moderately low precipitation in the grazeable areas.

15. Tallac-Fugawee-Jorge

Moderately sloping to steep, moderately deep to very deep, well drained soils; on mountain slopes and moraines

This map unit is mostly in the Sierra Nevada Mountains in the western part of the survey area. The vegetation is mainly white fir, California red fir, and Jeffrey pine with an understory of manzanita, snowbrush ceanothus, and squawcarpet. This unit makes up about 3 percent of the survey area.

The moderately sloping to steep Tallac soils are on glacial moraines. These soils are deep. They are moderately coarse textured and are very stony or very bouldery throughout.

The moderately steep to steep Fugawee soils are on mountainous uplands. These soils are moderately deep over weathered bedrock. They are moderately coarse textured in the surface layer and moderately fine textured and medium textured in the subsoil.

The moderately steep to steep Jorge soils are on mountainous uplands. These soils are very deep. They are moderately coarse textured in the surface layer and medium textured in the subsoil and are very gravelly throughout.

Of minor extent in this unit are Hirschdale and Boomtown soils and Rock outcrop. The Hirschdale and Boomtown soils are on upland slopes and have a clayey subsoil.

This unit is used mainly as woodland and for woodland wildlife habitat. The main limitations for these uses are the moderate precipitation and the steep slopes.

16. Meiss-Sibelia-Rock outcrop

Moderately steep to steep, shallow and deep, well drained to excessively drained cold soils and Rock outcrop; on uplands

This map unit is in the western part of the survey area on the highest mountain ridges and the high plateau of the Carson Range. The vegetation is mainly lodgepole pine, western white pine, whitebark pine, low sagebrush, lupine, willows, sedges, and quaking aspen. This unit makes up about 2 percent of the survey area.

The excessively drained Meiss soils are on ridges and crests of mountains. These soils are shallow over bedrock and are moderately coarse textured and medium textured throughout.

The well drained Sibelia soils are on mountainous upland slopes. These soils are deep and are moderately coarse textured and very gravelly throughout.

The Rock outcrop is on peaks and ridges. It is barren and is mostly volcanic rock.

Of minor extent in this unit are Sibelia Variant, Carioca, Macareeno, and Blackwell soils. The Sibelia Variant and Carioca soils are on high plateaus. The Marcareeno soils, in snow pocket areas, are poorly drained and support quaking aspen. The Blackwell soils are on flood plains and support meadow vegetation.

This unit is used mainly as woodland and for woodland wildlife habitat. The main limitation for these uses is the very short growing season.

17. Corbett-Toiyabe-Rock outcrop

Moderately steep to very steep, shallow and moderately deep, somewhat excessively drained and excessively drained soils and Rock outcrop; on mountainous granitic uplands

This map unit is mostly on the lower slopes of the Sierra Nevada Mountains in the western part of the survey area. The vegetation is mainly Jeffrey pine. This unit makes up about 2 percent of the survey area.

The moderately steep to steep, somewhat excessively drained Corbett soils are on mountainous uplands. These soils are moderately deep over granitic rock and are coarse textured throughout.

The moderately steep to very steep, excessively drained Toiyabe soils are on mountainous uplands. These soils are shallow over weathered granitic bedrock and are coarse textured throughout.

The Rock outcrop is on peaks and ridges. It is barren and consists of granitic rock.

Of minor extent in this unit are Haypress, Railcity, Marla, Gabica, and Blackwell soils. The Railcity soils are in material from landslides. The Blackwell soils are on flood plains. The Marla soils are on alluvial fans. The Gabica soils are on windswept ridges. The Haypress soils are on lower north-facing slopes.

This unit is used mainly as woodland and for woodland wildlife habitat. The main limitations for these uses are the lack of adequate precipitation for timber production and the low available water capacity of the soils.

18. Temo-Witefels-Rock outcrop

Moderately steep to very steep, shallow and moderately deep, somewhat excessively drained and excessively drained cold soils and Rock outcrop; on mountainous granitic uplands

The map unit is mostly on the higher slopes of the Sierra Nevada Mountains in the western part of the survey area. The vegetation is mainly white fir, California red fir, Jeffrey pine, western white pine, whitebark pine, and prostrate manzanita. This unit makes up about 1 percent of the survey area.

The steep, excessively drained Temo soils are on mountainous uplands. These soils are shallow over weathered granitic rocks and are coarse textured throughout.

The moderately steep to very steep, somewhat excessively drained Witefels soils are on mountainous uplands. These soils are moderately deep over weathered granitic rocks and are coarse textured throughout.

The Rock outcrop is on peaks and ridges. It is barren and consists of granitic rock.

Of minor extent in this unit are Graylock, Blackwell, and Gabica soils. The Graylock soils are on steep colluvial slopes. The Blackwell soils are on flood plains. The Gabica soils are on wind-swept ridges.

This unit is used mainly as woodland and for woodland wildlife habitat. The main limitations for these uses are the very short growing season and the very low available water capacity of the soil.

Broad Land Use Considerations

The soils in Washoe County, South Part, vary widely in their potential for major land uses such as urban development, woodland, cropland, pasture, rangeland, and wildlife habitat. Extensive changes in land use took place during the time when this survey was made, and more changes can be expected in the near future. The major changes were conversion of cropland, pasture, rangeland, and woodland to urban uses. Also, some rangeland was converted to irrigated cropland.

Approximately 18 percent of the land in the area is used for urban development at various intensities. Map units 1, 2, 6, 7, 8, 10, and parts of 12 are extensively used for urban development. Careful management of nearly all these soils is needed to overcome their limitations for urban development. The hazard of flooding is a limitation on the soils in map units 1 and 6. The seasonal high water table is a limitation in map units 1 and 2. In some of the soils in map units 2, 7, and 12, the high clay content in the subsoil is a limitation to use for urban development. Because of the steepness of slope and restricted depth to hardpan or bedrock in the soils in map units 7, 10, and 12, special design or use of special equipment is required.

Approximately 70 percent of the land in the survey area is used for rangeland and related uses. The productivity of the soils used for this purpose varies widely. In the map units in the eastern part of the survey area, mainly units 3, 4, 5, and 9, low precipitation is a limitation to rangeland grazing. Steepness of slope, which makes access for livestock difficult, is a limitation mainly on units 9, 10, 11, and 12.

About 10 percent of the land in the area is used as woodland. Map units 14, 15, 16, 17, and 18 are the main areas used. The commercial value of these woodlands varies for the different types of soils. The main

limitations are the limited precipitation at lower elevations, the short growing season at higher elevations, and soil properties such as low available water capacity, steepness of slope, and shallowness of the root zone over bedrock. In addition to their commercial value for timber production, these woodlands also have esthetic value that should be considered when making management decisions.

Less than 2 percent of the land in the survey area is used for cropland and pasture. About 20 percent of the area would be suitable for cropland if irrigation water were available and other uses did not have priority. The main crops are small grains and alfalfa and some potatoes. The areas used are mainly in map units 1, 2, 6, and 8. The seasonal high water table is a limitation in map unit 1; salt and alkali limit the use of map unit 2; and the lack of water for irrigation limits the use of map units 6 and 8.

Almost all of Washoe County, South Part, is inhabited by one or more kinds of wildlife. The Truckee River, Washoe Lake, Pyramid Lake, and the large irrigation ditches in the Truckee meadows support several kinds of fish.

The openland wildlife common to the area includes pheasant, valley quail, cottontail rabbit, meadowlark, and killdeer. Map unit 1 is used extensively by these species. This unit provides good habitat because water is available and the native meadows and pasture provide food and cover. The small areas of cropland and rangeland in these units provide additional food and cover and further enhance the overall habitat. The parts of map units 2, 6, 7, and 8 that are irrigated are also used by openland wildlife species. Watering places need to be provided when the areas are not being irrigated. Fence rows, ditchbanks, and odd corners can be planted to selected plants to improve the habitat. The adjacent range areas provide additional cover.

The wetland wildlife common to the survey area includes ducks, geese, herons, muskrat, and beaver. Map unit 1 is the only area that extensively supports wetland wildlife. The soils in map unit 1 support wetland plants. Shallow water areas can be established on the nearly level soils of this unit. Establishing shallow water areas on the more sloping soils is more difficult. In areas that have been drained, limitations to use of the soils for wetland wildlife habitat are severe.

The rangeland wildlife common to the area includes antelope, mule deer, jackrabbit, chukar, and sage grouse. Map units 6, 7, 8, 10, 11, 12, and 13 are used extensively by rangeland wildlife. In much of this area, the native plant community is limited by the low precipitation. Proper design and placement of watering facilities are beneficial.

The woodland wildlife common to the area includes wild turkey, blue grouse, woodpeckers, squirrels, raccoon, and a few black bear. Map units 14, 15, 16, 17, and 18 support woodland wildlife. Good watershed management practices will improve the habitat.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Truckee silt loam, strongly saline, is one of several phases in the Truckee series.

Some map units are made up of two or more major soils. These map units are called soil complexes or soil associations.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Settlemeyer-Notus complex is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Barnard-Trosi association is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

101—Aquinas sandy loam, 4 to 8 percent slopes. This moderately deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is light brown sandy clay loam about 30 inches thick. The upper 9 inches of the substratum is a strongly silica-cemented hardpan. The lower part to a depth of 60 inches is compacted stratified valley fill. Depth to the hardpan ranges from 30 to 40 inches.

Included in this unit are Jowec Variant soils on the toe slopes of alluvial fans, Greenbrae soils on inset alluvial fans at lower parts of the unit, and Northmore soils on alluvial fan collars on the upper part of the unit. The unit is about 5 percent Jowec Variant soils, 5 percent Greenbrae soils, and 5 percent Northmore soils.

Permeability of this Aquinas soil is slow. Available water capacity is moderate. Effective rooting depth is 30 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the moderately high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and diverting water so that the soil near buildings is kept dry. The main limitations for septic tank absorption fields are the slowly permeable subsoil and the hardpan. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan.

The low load-bearing strength and susceptibility of the soil to frost heaving are moderate limitations to the use of this soil as sites for roads. If roads are built across areas of this soil, suitable material should be added to strengthen the base and drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by the restricted depth of the root zone over the hardpan, the low precipitation, and the moderate available water capacity. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated.

102—Aquinas sandy loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil is light brown sandy clay loam about 30 inches thick. The upper 9 inches of the substratum is a strongly silica-cemented hardpan. The lower part to a depth of 60 inches is compacted, stratified valley fill. The depth to the hardpan ranges from 30 to 40 inches.

Included in this unit are Jowec Variant soils on the toe slopes of alluvial fans, Greenbrae soils on inset alluvial fans on lower parts of the unit, and Northmore soils on alluvial fan collars. The unit is about 5 percent Jowec Variant soils, 5 percent Greenbrae soils, and 5 percent Northmore soils.

Permeability of this Aquinas soil is slow. Available water capacity is moderate. Effective rooting depth is 30 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The steepness of slope and the high clay content of this soil are moderate limitations to use of the unit as sites for dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitations to use of this unit as septic tank absorption fields are the slowly permeable subsoil and the hardpan. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. Ripping the hardpan improves the suitability of the soil for septic tank absorption fields.

Steepness of slopes, low load-bearing strength, and susceptibility to frost heaving are moderate limitations to use of the unit as sites for roads. Roads should be provided with a stable base and drainage and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas of this soil is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the restricted depth of the root zone over the hardpan, the low precipitation, and the moderate available water capacity. This soil is rated as poorly suited to rangeland seeding because of low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed to maintain adequate plant cover to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated.

106—Aquinas sandy loam, 8 to 15 percent slopes, eroded. This moderately deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is brown sandy loam about 1 inch thick. The subsoil is light brown sandy clay loam about 28 inches thick. The upper 7 inches of the substratum is a strongly silica-cemented hardpan. The lower part to a depth of 60 inches is compacted stratified valley fill. Depth to the hardpan ranges from 30 to 40 inches.

Included in this unit are Jowec Variant soils on the toe slopes of alluvial fans, eroded Badland on steeper side slopes, Holbrook soils near drainageways, and Aquinas soils that have slopes of 15 to 50 percent. The unit is about 4 percent Jowec Variant soils, 4 percent Badland, 4 percent Holbrook soils, and 3 percent steeper Aquinas soils.

Permeability of this Aquinas soil is slow. Available water capacity is moderate. Effective rooting depth is 30 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the steepness of slope and high clay content of this soil are moderate limitations to use as sites for dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitations to use of this unit as septic tank absorption fields are the slowly permeable subsoil and the hardpan. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. Ripping the hardpan improves the suitability of the soil for septic tank absorption fields.

Steepness of slope, low load-bearing strength, and susceptibility to frost heaving are moderate limitations to use of this soil as sites for roads. Roads should be provided with drainage and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by the restricted depth of the root zone over the hardpan, low precipitation, and moderate available water capacity. This soil is rated as poorly suited to rangeland seeding because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated.

110—Jowec Variant sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on convex alluvial fans and terraces. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The upper 10 inches of the subsoil is light brown clay. The lower 46 inches is light yellowish brown sandy clay loam, sandy loam, or clay loam.

Included in this unit are Aquinas soils on alluvial fan remnants on slightly higher surfaces, Greenbrae soils on inset alluvial fans near the lower edge of the unit, Northmore soils near the bottom of smooth and less sloping areas, and Badland. The unit is about 4 percent Aquinas soils, 4 percent Greenbrae soils, 4 percent Northmore soils, and 3 percent Badland.

Permeability of this Jowec Variant soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the high clay content is a moderate limitation to use as sites for dwellings. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the very slow permeability in the upper part of the subsoil. The limitation can be overcome by increasing the size of the absorption field.

The susceptibility of the soil to frost heaving and high clay content are moderate limitations to use of this soil as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush and Indian ricegrass. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

111—Jowec Variant-Greenbrae sandy loams, 4 to 15 percent slopes. This map unit is on rolling terraces. Elevation is 4,500 to 5,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 65 percent Jowec Variant sandy loam, 8 to 15 percent slopes, and 25 percent Greenbrae sandy loam, 4 to 8 percent slopes. Areas of these soils are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Aquinas soils on alluvial fan remnants on slightly higher surfaces; Northmore soils on lower parts of smooth and less sloping surfaces; and Verdico Variant soils, which occur on uplands and have bedrock within 40 inches. This unit is about 3 percent Aquinas soils, 5 percent Northmore soils, and 2 percent Verdico Variant soils.

The Jowec Variant soil is very deep and well drained. It formed in alluvium derived dominantly from granitic rocks. Typically, the surface layer is grayish brown sandy

loam about 12 inches thick. The upper 10 inches of the subsoil is light brown clay. The lower part to 60 inches is light brown stratified sandy clay loam, clay loam, and clay.

Permeability of the Jowec Variant soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Greenbrae soil is very deep and well drained. It formed in alluvium derived dominantly from granitic rocks. Slope is 4 to 8 percent. Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The subsoil is brown sandy clay loam and clay loam about 18 inches thick. The substratum to a depth of 63 inches or more is pale brown stratified sand, gravelly loam, and loam.

Permeability of the Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the high clay content of both soils and the steepness of slope of the Jowec Variant soil are moderate limitations for dwellings. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the restricted permeability. This limitation can be reduced by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

Steepness of slope, susceptibility to frost heaving, and high clay content are moderate limitations to use of this soil as sites for roads. Roads should be provided with drainage and an adequate wearing surface. They should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and Indian ricegrass. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The soils in this unit are in capability subclass VIs, nonirrigated.

120—Doten silty clay, 0 to 2 percent slopes. This very deep, moderately well drained soil is on lake terraces. It formed in alluvium derived from mixed rock. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown silty clay about 7 inches thick. The underlying material to a depth of 60 inches is grayish brown and averages clay and silty clay. Typically, this soil cracks open at the surface when dry.

Included in this unit are Mellor soils on slightly higher terraces, Playas, Jowec soils on upper edges of terraces, and Parran soils near seeps and wet spots on lower landscape positions. This unit is about 3 percent Mellor soils, 3 percent Playas, 6 percent Jowec soils, and 3 percent Parran soils.

Permeability of this Doten soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is ponded or very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to rare flooding during storms of unusually high intensity. The seasonal high water table is at a depth of 60 to 72 inches in spring. Channeling and deposition are common along streambanks. In some areas, this soil is ponded for long periods during spring.

This unit is used for urban development and as rangeland.

Flooding, high clay content, and low load-bearing strength are limitations to use of this soil as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The high shrink-swell potential, which results from the high clay content of this soil, can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is very slow permeability. The limitation can be overcome by increasing the size of the absorption field.

The main limitations to use of this soil as sites for roads are high clay content, flooding, and low load-bearing strength. Suitable material should be added to provide adequate wearing surface and a stable base. Roads should be provided with drainage.

The present vegetation in most areas is mainly black greasewood, shadscale, and bottlebrush squirreltail. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is in capability subclass VIIs, nonirrigated.

121—Doten silty clay, 8 to 15 percent slopes. This very deep, moderately well drained soil is on lake terraces and clay dunes. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown silty clay about 8 inches thick. The underlying material to a depth of 60 inches is grayish brown clay or silty clay.

Included in this unit are Doten Variant soils on lower lake terraces and Updike soils between clay dunes on lower lake terraces. The unit is about 8 percent Doten Variant soils and 7 percent Updike soils.

Permeability of this Doten soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for dwellings are the high clay content, which results in high shrink-swell potential, and the low load-bearing strength. The high shrink-swell potential and low load-bearing strength can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is very slow permeability. This limitation can be overcome by increasing the size of the absorption field.

The main limitations to use of this soil as sites for roads are the high clay content and low load-bearing strength. If roads are constructed across areas of this soil, suitable material should be added to provide an adequate wearing surface and a stable base.

The present vegetation in most areas is mainly black greasewood, shadscale, and bottlebrush squirreltail. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is in capability subclass VIIs, nonirrigated.

130—Greenbrae sandy loam, clayey substratum, 0 to 2 percent slopes. This very deep, well drained soil is on terraces and lower parts of alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The subsoil is brown sandy clay loam and sandy clay about 17 inches thick. The upper 29 inches of the substratum is gravelly sandy loam. The lower part of the substratum to a depth of 60 inches is light gray silty clay loam.

Included in this unit are Orr Variant soils on lower alluvial fans, Haybourne soils on higher alluvial fan collars, and Northmore soils near the top of the unit. This unit is about 5 percent Orr Variant soils, 5 percent Haybourne soils, and 5 percent Northmore soils.

Permeability of this Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

This soil is well suited to use as sites for dwellings. The main limitation to use of this unit as septic tank absorption fields is the slowly permeable subsoil. The limitation can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

Susceptibility to frost heaving is a moderate limitation to use of this soil as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, rubber rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by low precipitation. Because precipitation is low, this soil is rated as poorly suited to rangeland seeding. Clearing of brush would encourage the growth of desirable forage grasses. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated, and IIs, irrigated.

131—Greenbrae sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on terraces and lower parts of alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The subsoil is brown sandy clay loam or clay loam about 20 inches thick. The substratum to a depth of 63 inches or more is light yellowish brown gravelly fine sandy loam and loam.

Included in this map unit are Haybourne soils on the inset alluvial fans, Indian Creek soils on terrace

remnants, and Northmore soils along the top of the unit. The unit is about 5 percent Haybourne soils, 5 percent Indian Creek soils, and 5 percent Northmore soils.

Permeability of this Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This unit is used for urban development and rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the limitation to use as sites for dwellings is the high clay content, which causes moderately high shrink-swell potential. The shrink-swell potential can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed, and the soil is kept dry by diverting water away from the buildings. The main limitation to use of the unit as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

Low strength, the susceptibility of the soil to frost heaving, and high clay content are moderate limitations to use of this unit as sites for roads. Suitable base material and an adequate wearing surface are needed. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and Thurber needlegrass. The production of forage is limited by low precipitation. This soil is rated poor for rangeland seeding because of the low precipitation. Grazing should be delayed until the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush encourages the growth of desirable forage grasses. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated, and IIs, irrigated.

132—Greenbrae sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on terraces and lower parts of alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 8 inches thick. The subsoil is brown clay loam about 20 inches thick. The substratum to a depth of 63 inches or more is pale brown, stratified coarse sand, gravelly loam, and loam.

Included in this unit are Orr Variant soils on lower-lying alluvial fans, Indian Creek soils on remnants of higher terraces, and Northmore soils along the top of the unit. The unit is about 5 percent Orr Variant soils, 5 percent Indian Creek soils, and 5 percent Northmore soils.

Permeability of this Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, a moderate limitation to use as sites for dwellings is high clay content, which results in moderately high shrink-swell potential. The moderately high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. The limitation of slow permeability can be overcome by increasing the size of the absorption field. Percolation can be improved in some areas by placing the leach line below the least permeable layer.

Low load-bearing strength, susceptibility to frost heaving, and high clay content are moderate limitations to use of this soil as sites for roads. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and Thurber needlegrass. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed to insure that enough vegetation is left to protect the unit from excessive erosion. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIs, nonirrigated, and IIs, irrigated.

134—Greenbrae sandy loam, clayey substratum, 4 to 8 percent slopes. This very deep, well drained soil is on terraces and lower parts of alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 6 inches thick. The subsoil is brown sandy clay loam about 18 inches thick. The upper 28 inches of the substratum is pale brown sandy loam. The lower part of the substratum to a depth of 68 inches is silty clay

loam. Depth to the clayey material ranges from 40 to 70 inches.

Included in this unit are Orr Variant soils on lower-lying alluvial fans, Haybourne soils on alluvial fan collars, and Northmore soils along the top of the unit. This unit is about 5 percent Orr Variant soils, 5 percent Haybourne soils, and 5 percent Northmore soils.

Permeability of this Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

This soil is well suited to use as sites for dwellings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving is a moderate limitation to use of this soil as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, rubber rabbitbrush, and Indian ricegrass. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated.

136—Greenbrae sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on terraces and lower parts of alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 12 inches thick. The subsoil is brown clay loam about 20 inches thick. The substratum to a depth of 63 inches or more is pale brown stratified coarse sand, gravelly loam, and loam.

Included in this unit are Orr Variant soils on less-sloping and lower lying alluvial fans, Indian Creek soils on remnants of slightly higher terraces, and Northmore soils along the top of the unit. This unit is about 5 percent Orr Variant soils, 5 percent Indian Creek soils, and 5 percent Northmore soils.

Permeability of this Greenbrae soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, a moderate limitation to use of this soil as sites for dwellings is high clay content, which causes moderately high shrink-swell potential. The moderately high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. The limitation can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

Low load-bearing strength, susceptibility to frost heaving, and the high clay content are moderate limitations to use of this soil as sites for roads. If roads are constructed across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, rubber rabbitbrush, and Indian ricegrass. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated.

140—Haybourne loamy sand, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,900 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown loamy sand about 10 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum to a depth of 63 inches or more is brown, stratified fine sandy loam through coarse sand.

Included in this unit are Greenbrae soils on toe slopes of alluvial fans; Indian Creek soils on remnants of higher terraces; and Incy soils, which are wind-blown sand and are on dunes. This unit is about 5 percent Greenbrae soils, 5 percent Indian Creek soils, and 5 percent Incy soils.

Permeability of this Haybourne soil is moderately rapid in the subsoil and moderately rapid to rapid in the substratum. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more.

Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for construction of dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The rapidly permeable substratum is a limitation to use of this soil as septic tank absorption fields. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Susceptibility to frost heaving and flooding are moderate limitations to use of this soil as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, green ephedra, and Anderson peachbrush. The production of forage is limited by low precipitation and the moderate available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity of the surface layer. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIs, nonirrigated.

141—Haybourne loamy sand, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,900 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown loamy sand about 10 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum to a depth of 60 inches or more is brown, stratified fine sandy loam, loamy sand, and coarse sand.

Included in this unit are Incy soils, which are wind-blown sand and are on dunes; Indian Creek soils on remnants of higher terraces, and Linhart soils on inset alluvial fans near drainageways. This unit is about 5 percent Incy soils, 5 percent Indian Creek soils, and 5 percent Linhart soils.

Permeability of this Haybourne soil is moderately rapid in the subsoil and moderately rapid to rapid in the substratum. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for construction of dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The rapidly permeable substratum is a limitation to use of this soil as septic tank absorption fields. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Susceptibility to frost heaving and flooding are moderate limitations to use of this soil as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and Indian ricegrass. The production of forage is limited by low precipitation and moderate available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIs, nonirrigated.

142—Haybourne loamy sand, 8 to 15 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 5,900 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown loamy sand about 12 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum to a depth of 60 inches or more is brown, stratified fine sandy loam, loamy sand, and coarse sand.

Included in this map unit are Incy soils on dunes, Indian Creek soils on remnants of higher terraces, and Linhart soils on inset alluvial fans near drainageways. The unit is about 5 percent Incy soils, 5 percent Indian Creek soils, and 5 percent Linhart soils.

Permeability of this Haybourne soil is moderately rapid in the subsoil and moderately rapid to rapid in the substratum. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash flooding during storms of unusually high

intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this soil as sites for dwellings. Structures for protection from flash floods are difficult to establish and maintain. The main limitation to the use of this soil as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Moderate limitations for roads are the steepness of slope, flooding, and susceptibility to frost heaving. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and Indian ricegrass. The production of forage is limited by low precipitation and the moderate available water capacity of the soil. This soil is rated as very poorly suited to rangeland seeding because of the low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated.

150—Doten Variant silty clay, slightly saline. This very deep, moderately well drained soil is on low terraces. It formed in lacustrine deposits derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is light gray silty clay about 5 inches thick. The underlying material to a depth of 72 inches is light gray silty clay and clay.

Included in this unit are Greenbrae soils along the upper part of the unit on alluvial fans, Updike soils on remnants of low terraces between drainageways, and Doten Variant, strongly saline, soils along the lower edge of the unit. The unit is about 5 percent Greenbrae soils, 5 percent Updike soils, and 5 percent Doten Variant, strongly saline, soils.

Permeability of this Doten Variant soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 60 to 72 inches in late winter and spring. This soil is slightly affected by sodium salts. When dry, the surface has cracks 1 to 2 inches wide and 2 to 3 feet deep.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is the high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is very slow permeability. This limitation can be overcome by increasing the size of the absorption field.

Low load-bearing strength and high clay content are moderate limitations to use of this soil as sites for roads. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly black greasewood and saltgrass. The production of forage is limited by low precipitation and salinity and alkalinity. This soil is poorly suited to rangeland seeding, mainly because of low precipitation and salinity and alkalinity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is in capability subclass VIIs, nonirrigated.

151—Doten Variant silty clay, strongly saline. This very deep, moderately well drained soil is on low terraces. It formed in lacustrine deposits derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is light gray silty clay about 5 inches thick. The underlying material to a depth of 72 inches is light gray silty clay and clay.

Included in this unit are Greenbrae soils on higher parts on toe slopes of alluvial fans, Updike soils on remnants of low terraces between drainageways, and Doten Variant, slightly saline, soils along the upper edge of the unit. The unit is about 5 percent Greenbrae soils, 5 percent Updike soils, and 5 percent Doten Variant, slightly saline, soils.

Permeability of this Doten Variant soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 60 to 72 inches in late winter and spring. This soil is strongly affected by sodium salts.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which results in high shrink-swell

potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is very slow permeability. This limitation can be overcome by increasing the size of the absorption field.

Low load-bearing strength and high clay content are moderate limitations to use of this soil as sites for roads. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly black greasewood and saltgrass. The production of forage is limited by low precipitation and salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of salinity and alkalinity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is in capability subclass VIIs, nonirrigated.

160—Incy sand, 4 to 8 percent slopes. This very deep, excessively drained soil is on low-lying dunes superimposed over alluvial fans. It formed in eolian sand derived from mixed, but dominantly granitic, rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sand about 9 inches thick. The underlying material to a depth of 60 inches is pale brown sand.

Included in this unit are Greenbrae soils on the toe slopes of lower alluvial fans, Wedertz soils on lower alluvial fans and terraces, and Haybourne soils on higher alluvial fans near drainageways. The unit is about 5 percent Greenbrae soils, 5 percent Wedertz soils, and 5 percent Haybourne soils.

Permeability of this Incy soil is very rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used for urban development and range.

This unit is well suited to use as sites for dwellings. The main limitation for septic tank absorption fields is the very rapidly permeable substratum. Because the substratum is very rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. Roads can easily be constructed and maintained on this soil.

The present vegetation in most areas of this soil is mainly big sagebrush, Anderson peachbrush, and antelope bitterbrush. The production of forage is limited by the low available water capacity. This soil is rated as very poorly suited to rangeland seeding because the available water capacity of the surface layer is low. Grazing should be delayed until the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from erosion.

This soil is in capability subclass VIIs, nonirrigated.

161—Incy fine sand, hilly. This very deep, excessively drained soil is on sand dunes. It formed in eolian sand derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown fine sand about 12 inches thick. The underlying material to a depth of 60 inches is pale brown fine sand.

Included in this unit are Dalzell soils between sand dunes, Haybourne soils on higher alluvial fans near drainageways, Wedertz soils on lower alluvial fans and terraces, and Playas. The unit is about 4 percent Dalzell soils, 5 percent Haybourne soils, 4 percent Wedertz soils, and 2 percent Playas.

Permeability of this Incy soil is very rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is the steepness of slope. The main limitations to use of this soil as septic tank absorption fields are the very rapid permeability and the steepness of slope. Because the underlying material is very rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies and to prevent surfacing of the leachate downslope.

The main limitation to use of this soil as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and antelope bitterbrush. The production of forage is limited by the low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the low available water capacity of the surface layer. Grazing should be delayed until the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

171—Indian Creek gravelly sandy loam, 0 to 4 percent slopes. This shallow, well drained soil is on

dissected fans and terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 25 to 35 percent of the surface is covered with gravel. The surface layer is pale brown gravelly sandy loam about 7 inches thick. The subsoil is light brown gravelly clay about 11 inches thick. The upper 7 inches of the substratum is a reddish yellow indurated hardpan. The lower part to a depth of 60 inches is reddish yellow, stratified very gravelly loamy coarse sand through gravelly sandy clay loam. Depth to the hardpan ranges from 14 to 20 inches.

Included in this unit are Cassiro soils on higher, smooth alluvial fans; Northmore soils on smooth, long slopes of alluvial fans on lower landscape positions; and Washoe soils near drainageways. This unit is about 5 percent Cassiro soils, 5 percent Northmore soils, and 5 percent Washoe soils.

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the hardpan. Heavy equipment is needed to cut through the hardpan. The main limitations to use of this unit as septic tank absorption fields are the very slowly permeable subsoil and the hardpan.

The hardpan is the main limitation to use of this soil as sites for roads. Deep cuts should be avoided because of the underlying hardpan.

The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the restricted depth of the root zone over the hardpan and the very low available water capacity. This soil is rated as poorly suited to rangeland seeding, mainly because of the very low available water capacity and the restricted depth of the root zone over the hardpan. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

172—Indian Creek sandy loam, 4 to 8 percent slopes. This shallow, well drained soil is on dissected alluvial fans and terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 10 to 20 percent of the surface is covered with gravel. The surface layer is pale brown sandy loam about 8 inches thick. The subsoil is light brown gravelly clay about 10 inches thick. The upper 7 inches of the substratum is a white indurated hardpan. The lower part to a depth of 60 inches is reddish yellow, stratified very gravelly loamy coarse sand through gravelly sandy clay loam. Depth to the hardpan ranges from 14 to 20 inches.

Included in this unit are Cassiro soils on higher, smooth alluvial fans; Northmore soils on smooth, long slopes of alluvial fans in lower landscape positions; and Washoe soils near drainageways. This unit is about 5 percent Cassiro soils, 5 percent Northmore soils, and 5 percent Washoe soils.

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation for construction of dwellings is the hardpan. Heavy equipment is needed to cut through the hardpan. The main limitations to use of this soil as septic tank absorption fields are the very slowly permeable subsoil and the hardpan. In some areas, the percolation can be improved by placing the leach line below the hardpan.

The main limitation to use of this soil as sites for roads is the hardpan. Deep cuts should be avoided because of the hardpan.

The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the shallowness of the root zone over the hardpan and the very low available water capacity. This soil is rated as very poorly suited to rangeland seeding, mainly because of the very low available water capacity and the shallowness of the root zone. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

173—Indian Creek sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on dissected alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 10 to 20 percent of the surface is covered with gravel. The surface layer is pale brown sandy loam about 8 inches thick. The subsoil is light brown gravelly clay about 10 inches thick. The upper 7 inches of the substratum is a white indurated hardpan. The lower part to a depth of 60 inches is reddish yellow, stratified very

gravelly loamy coarse sand to gravelly sandy clay loam. Depth to the hardpan ranges from 14 to 20 inches.

Included in this unit are Cassiro soils along the upper edge of the unit on smooth alluvial fans; Northmore soils on smooth, long slopes of lower alluvial fans; and Washoe soils near drainageways. This unit is about 5 percent Cassiro soils, 5 percent Northmore soils, and 5 percent Washoe soils.

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the hardpan. Heavy equipment is needed to cut through the hardpan. The main limitations to use of this soil as septic tank absorption fields are the very slowly permeable subsoil and the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitation to use of this soil as sites for roads is the hardpan. Deep cuts should be avoided because of the hardpan.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. The production of forage is limited by the shallowness of the root zone over the hardpan and the very low available water capacity. Because the root zone is shallow and the available water capacity is very low, this soil is rated as very poorly suited to rangeland seeding. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

174—Indian Creek extremely stony sandy loam, 2 to 8 percent slopes. This shallow, well drained soil is on terrace remnants. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 15 to 30 percent of the surface is covered with stones. The surface layer is pale brown extremely stony sandy loam about 7 inches thick. The subsoil is light brown gravelly clay about 12 inches thick. The upper 4 inches of the substratum is a white indurated hardpan. The lower part to a depth of 60 inches is a light gray strongly cemented hardpan. Depth to the hardpan ranges from 14 to 20 inches.

Included in this unit are Leviathan soils on higher, smooth alluvial fans; Verdico soils on upland pediments near scarps; and Washoe soils near drainageways. This unit is about 5 percent Leviathan soils, 5 percent Verdico soils, and 5 percent Washoe soils.

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitations to use as sites for construction of dwellings are the hardpan and the high clay content, which results in a high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. Heavy equipment is needed to cut through the hardpan. The very slowly permeable subsoil and the hardpan are limitations to use of this soil as septic tank absorption fields.

The main limitations to use of this soil as sites for roads are the hardpan, high clay content, and low load-bearing strength. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface. Deep cuts should be avoided because of the underlying hardpan.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the restricted depth of the root zone over the hardpan and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the restricted depth of the root zone over the hardpan. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

175—Indian Creek very cobbly loam, 4 to 8 percent slopes. This shallow, well drained soil is on terraces and dissected alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 40 to 60 percent of the surface is covered with cobbles. The surface layer is pale brown very cobbly loam about 7 inches thick. The subsoil is light brown gravelly clay about 12 inches thick. The upper 4 inches of the substratum is a white indurated duripan. The lower part of the substratum to a depth of 60 inches is reddish yellow, stratified very gravelly loamy coarse sand through gravelly sandy clay loam. Depth to the hardpan ranges from 14 to 20 inches.

Included in this unit are Barnard soils at higher elevations on smooth or slightly concave surfaces, Spasprey soils on lower alluvial fan skirts, and Washoe

soils near drainageways. This unit is about 5 percent Barnard soils, 5 percent Spasprey soils, and 5 percent Washoe soils.

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitation to use as sites for construction of dwellings is the hardpan. Heavy equipment is needed to cut through the hardpan. The main limitations to use of this soil as septic tank absorption fields are the very slowly permeable subsoil and the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The hardpan is the main limitation to use of this soil as sites for roads. Deep cuts should be avoided because of the hardpan.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the shallowness of the root zone over the hardpan and the very low available water capacity. Because the available water capacity is very low and the root zone is shallow, the suitability of this soil for rangeland seeding is very poor. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

176—Indian Creek-Reno-Washoe association. This map unit is on dissected alluvial fans and terraces. Elevation is 4,400 to 5,500 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

This unit is 50 percent Indian Creek stony loam, 2 to 15 percent slopes; 20 percent Reno very stony sandy loam, 2 to 15 percent slopes; and 15 percent Washoe extremely stony fine sandy loam, 4 to 15 percent slopes. The Indian Creek soil is on the tops of dissected alluvial fans. The Reno soil is on stream terraces. The Washoe soil is on inset fans and adjacent to drainageways.

Included in this unit are Barnard soils at higher elevations on smooth or slightly concave surfaces, Bundorf soils at lower elevations on remnants of terraces, Manogue soils on shallow depressions, and Rezave soils on small upland remnants. This unit is about 4 percent Barnard soils, 4 percent Bundorf soils, 4 percent Manogue soils, and 3 percent Rezave soils.

The Indian Creek soil is shallow and well drained. It formed in alluvium derived from mixed rock sources. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is pale brown stony loam about 7 inches thick. The subsoil is light brown gravelly clay about 12 inches thick. The upper 4 inches of the substratum is an indurated hardpan. The lower part of the substratum to a depth of 60 inches is stratified very gravelly or very cobbly loamy coarse sand through gravelly sandy clay loam. Depth to the hardpan ranges from 14 to 20 inches.

Permeability of this Indian Creek soil is very slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Reno soil is moderately deep and well drained. It formed in alluvium derived dominantly from mixed rock sources. Typically, 5 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 2 inches thick. The subsoil is pale brown and light yellowish brown clay about 22 inches thick. The substratum is a strongly silica-cemented hardpan about 23 inches thick over weakly consolidated sediment. Depth to the hardpan ranges from 20 to 40 inches.

Permeability of this Reno soil is very slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is slow to moderate, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Washoe soil is very deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, about 15 percent of the surface is covered with stones. The surface layer is grayish brown extremely stony fine sandy loam about 8 inches thick. The subsoil is light brown very gravelly sandy loam and very gravelly sandy clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown very gravelly loamy coarse sand.

Permeability of this Washoe soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Indian Creek soil is mainly low sagebrush and cheatgrass. The production of forage is limited by very low available water capacity and the shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the shallow root zone.

The present vegetation in most areas of the Reno soil is mainly low sagebrush, antelope bitterbrush, and cheatgrass. A small amount of juniper is dispersed throughout. The production of forage is limited by moderately low precipitation, very low available water capacity, and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is poor, mainly because of the moderately low

precipitation, the very low available water capacity, and the restricted depth of the root zone.

The present vegetation in most areas of the Washoe soil is mainly big sagebrush. The production of forage is limited by low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the large stones on the surface.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The use of this unit as sites for roads is severely limited by the hardpan of the Indian Creek soil and the low load-bearing strength and high clay content of the Reno soil, and it is moderately limited by the high clay content, steepness of slope, and susceptibility to frost heaving of the Washoe soil. Roads should be provided with drainage. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the hardpan in the Indian Creek soils.

The soils in this unit are in capability subclass VIIs, nonirrigated.

190—Manogue cobbly clay, 2 to 8 percent slopes. This deep and very deep, well drained soil is on uplands. It formed in localized alluvium and colluvium derived dominantly from volcanic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 10 to 25 percent of the surface is covered with cobbles and pebbles. The surface layer is dark brown cobbly clay about 2 inches thick. The subsoil is brown clay about 61 inches thick. Weathered bedrock is at a depth of 63 inches. The depth to weathered bedrock ranges from 40 to 70 inches.

Included in this unit are Xman soils on higher, steeper, convex upland surfaces; Reno soils on terrace remnants; and Verdico Variant soils near outcrops of granitic rock. The unit is about 5 percent Xman soils, 5 percent Reno soils, and 5 percent Verdico Variant soils.

Permeability of this Manogue soil is very slow. Available water capacity is high. Effective rooting depth is 40 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which results in high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the very slowly permeable subsoil. This limitation can be reduced by increasing the size of the absorption field.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and high clay content. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly bottlebrush squirreltail. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

191—Manogue cobbly clay, 8 to 15 percent slopes. This deep and very deep, well drained soil is on uplands. It formed in localized alluvium and colluvium derived dominantly from volcanic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 10 to 25 percent of the surface is covered with cobbles and pebbles. The surface layer is dark brown cobbly clay about 3 inches thick. The subsoil is brown clay about 60 inches thick. Weathered bedrock is at a depth of 63 inches. The depth to weathered bedrock ranges from 40 to 70 inches.

Included in this unit are Old Camp soils along ridges near Rock outcrop, Reno soils on terrace remnants on lower parts, and Xman soils at higher elevations on convex slopes. The unit is about 5 percent Old Camp soils, 5 percent Reno soils, and 5 percent Xman soils.

Permeability of this Manogue soil is very slow. Available water capacity is high. Effective rooting depth is 40 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitation to use as sites for dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the very slowly permeable subsoil. This limitation can be reduced by increasing the size of the absorption field.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and high clay content. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly bottlebrush squirreltail. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

192—Manogue cobbly clay, 15 to 30 percent slopes. This deep and very deep, well drained soil is on uplands. It formed in alluvium and colluvium derived dominantly from volcanic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 10 to 25 percent of the surface is covered with cobbles and pebbles. The surface layer is dark brown cobbly clay about 4 inches thick. The subsoil is brown clay about 59 inches thick. Weathered bedrock is at a depth of 63 inches. The depth to weathered bedrock ranges from 40 to 70 inches.

Included in this unit are Old Camp soils along ridges near Rock outcrop, Xman soils at higher elevations on convex slopes, and Verdico Variant soils on smooth, slightly convex slopes. The unit is about 5 percent Old Camp soils, 5 percent Xman soils, and 5 percent Verdico Variant soils.

Permeability of this Manogue soil is very slow. Available water capacity is high. Effective rooting depth is 40 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitations to use as sites for dwellings are the high clay content, which causes high shrink-swell potential, and the steepness of slope. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitations to use of this soil as sites for septic tank absorption fields are the very slowly permeable subsoil and the steepness of slope. The limitation imposed by very slow permeability can be reduced by increasing the size of the absorption field. The absorption field should be designed to prevent surfacing of the leachate downslope.

The main limitations to use of this soil as sites for roads are low load-bearing strength, steepness of slope, and high clay content. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

200—Northmore sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 15 inches thick. The subsoil is brown sandy clay about 30 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam.

Included in this unit are Greenbrae soils on inset alluvial fans, Indian Creek soils on terrace remnants, Cassiro soils near drainageways and at higher elevations, and wet areas that support lush plant growth. The unit is about 6 percent Greenbrae soils, 4 percent Indian Creek soils, 3 percent Cassiro soils, and 2 percent wet areas.

Permeability of this Northmore soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow to medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and high clay content. If roads are built across areas of this soil,

suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed to insure that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass IIs, irrigated, and VIs, nonirrigated.

201—Northmore sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 15 inches thick. The subsoil is brown sandy clay about 30 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam.

Included in this unit are Greenbrae soils on inset alluvial fans at lower elevations, Indian Creek soils on terrace remnants, Cassiro soils near drainageways and at higher elevations, and wet areas that occur as seeps. The unit is about 6 percent Greenbrae soils, 4 percent Indian Creek soils, 3 percent Cassiro soils, and 2 percent wet areas.

Permeability of this Northmore soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and high clay content. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and littleleaf horsebrush. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclasses IIe, irrigated, and VIs, nonirrigated.

202—Northmore sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The subsoil is brown sandy clay about 35 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam.

Included in this unit are Greenbrae soils on inset alluvial fans at lower elevations, Indian Creek soils on terrace remnants, Cassiro soils near drainageways and at higher elevations, and wet areas that occur as seeps. The unit is about 6 percent Greenbrae soils, 4 percent Indian Creek soils, 3 percent Cassiro soils, and 2 percent wet areas.

Permeability of this Northmore soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and high clay content. If roads are built across areas of this soil,

suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas of this soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough soil is left to protect the unit from excessive erosion.

This soil is in capability subclasses IVe, irrigated, and VIs, nonirrigated.

203—Northmore sandy loam, 8 to 15 percent slopes. This very deep, well drained soil is on side slopes of alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 10 inches thick. The subsoil is brown sandy clay about 35 inches thick. The substratum to a depth of 60 inches or more is pale brown sandy loam.

Included in this unit are Indian Creek soils on terrace remnants, Cassiro soils near drainageways at higher elevations, and Oest soils on steep side slopes and along the top of the unit. The unit is about 5 percent Indian Creek soils, 5 percent Cassiro soils, and 5 percent Oest soils.

Permeability of this Northmore soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content. The high clay content can cause high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIs, nonirrigated.

210—Luppino gravelly sandy loam, 4 to 8 percent slopes. This shallow, well drained soil is on dissected pediments. It formed in residuum derived dominantly from granodiorite. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with fine gravel. The surface layer is brown gravelly sandy loam about 8 inches thick. The subsoil is yellowish brown sandy clay loam about 6 inches thick. Weathered granodiorite is at a depth of 14 inches. Unweathered granodiorite is at a depth of 23 inches. Depth to weathered bedrock ranges from 12 to 20 inches. Depth to hard bedrock ranges from 20 to 30 inches.

Included in this unit are Greenbrae soils on inset alluvial fans in the lower parts of wider dissections, Graufels soils near Rock outcrop, Linhart soils near drainageways, and Rock outcrop. The unit is about 6 percent Greenbrae soils, 4 percent Graufels soils, 3 percent Linhart soils, and 2 percent Rock outcrop.

Permeability of this Luppino soil is moderately slow. Available water capacity is very low. Effective rooting depth is 12 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

Depth to bedrock and high clay content are moderate limitations to use of this soil as sites for dwellings. Heavy equipment is needed to cut into the bedrock. The high clay content can cause moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the shallowness of this soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The susceptibility of this soil to frost heaving and depth to bedrock are moderate limitations to use of this soil as sites for roads. Deep cuts should be avoided because of the underlying bedrock. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush and Thurber needlegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the shallowness of the root zone. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

211—Luppino gravelly sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on dissected pediments. It formed in residuum derived dominantly from granodiorite. Elevation is 4,500 to 5,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with fine gravel. The surface layer is brown gravelly sandy loam about 8 inches thick. The subsoil is yellowish brown sandy clay loam about 6 inches thick. Weathered granodiorite is at a depth of 14 inches. Unweathered granodiorite is at a depth of 23 inches. Depth to weathered bedrock ranges from 12 to 20 inches. Depth to hard bedrock ranges from 20 to 30 inches.

Included in this unit are Graufels soils near Rock outcrop at higher elevations, Bedell soils on short alluvial fans and colluvial slopes, Linhart soils near drainageways, and Rock outcrop. The unit is about 6 percent Graufels soils, 4 percent Bedell soils, 3 percent Linhart soils, and 2 percent Rock outcrop.

Permeability of this Luppino soil is moderately slow. Available water capacity is very low. Effective rooting depth is 12 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The shallowness of this soil over bedrock, the high clay content, and the steepness of slope are moderate limitations to use of this unit as sites for construction of dwellings. Heavy equipment is needed to cut into the bedrock. The high clay content can result in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation for septic tank absorption fields is depth to bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations; however, if the density of housing is too high, community sewage systems are needed.

The susceptibility of this soil to frost heaving, shallowness over bedrock, and steepness of slope are moderate limitations to use of this unit as sites for roads. Deep cuts should be avoided because of the underlying bedrock. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and green ephedra. A small amount of juniper is dispersed throughout. The production of forage is limited by the shallowness of the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the shallowness of the root zone. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

221—Oppio cobbly sandy loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum derived dominantly from andesite and other volcanic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 20 to 35 percent of the surface is covered with cobbles. The surface layer is pale brown cobbly sandy loam about 3 inches thick. The subsoil is brown clay about 18 inches thick. Hard, fractured bedrock is at a depth of 21 inches. Depth to bedrock ranges from 20 to 40 inches.

Included in this unit are Yuko soils on rounded ridges and south-facing slopes; Old Camp soils near Rock outcrop; Barshaad soils on less sloping, slightly concave slopes; and Rock outcrop. The unit is about 5 percent Yuko soils, 4 percent Old Camp soils, 3 percent Barshaad soils, and 3 percent Rock outcrop.

Permeability of this Oppio soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the high clay content. The high clay content can cause high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is restricted depth to bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush and Douglas rabbitbrush. The production of forage is limited by the restricted depth of the root zone over bedrock and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIs, nonirrigated.

222—Oppio cobbly sandy loam, 15 to 30 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum derived dominantly from andesite and other volcanic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with cobbles. The surface layer is pale brown cobbly sandy loam about 5 inches thick. The subsoil is brown clay about 16 inches thick. Hard, fractured bedrock is at a depth of 21 inches. Depth to bedrock ranges from 20 to 40 inches.

Included in this unit are Yuko soils on rounded ridges, rounded tops, and south-facing slopes; Old Camp soils near Rock outcrop; Xman soils on slightly convex slopes; and Rock outcrop. The unit is about 5 percent Yuko soils, 4 percent Old Camp soils, 3 percent Xman soils, and 3 percent Rock outcrop.

Permeability of this Oppio soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitations to use of this unit as sites for construction of dwellings are the steepness of slope and high clay content. The high clay content can result in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitations to use of this unit as septic tank absorption fields are the restricted depth to bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, steepness of slope, and high clay content. Suitable material should be added to strengthen the base and provide an adequate wearing surface. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly low sagebrush and Douglas rabbitbrush. The production of forgage is limited by the restricted depth of the root zone over bedrock and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIs, nonirrigated.

223—Oppio-Rezave-Rock outcrop association. This map unit is on uplands. Elevation is 5,400 to 6,500 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 40 percent Oppio cobbly sandy loam, 4 to 15 percent slopes; 35 percent Rezave extremely stony very fine sandy loam, 0 to 15 percent slopes; and 10 percent Rock outcrop. The Oppio soil is on slightly concave parts of plateaus. The Rezave soil is on the convex part of plateaus and rounded hilltops. Rock outcrop is on peaks and ridges.

Included in this map unit are Mizel soils on steep, eroded, upper side slopes; Fireball soils on colluvial south-facing slopes; and Hefed soils on colluvial north- and east-facing slopes. The unit is about 6 percent Mizel soils, 5 percent Fireball soils, and 4 percent Hefed soils.

The Oppio soil is moderately deep and well drained. It formed in residuum dominantly of andesite and other volcanic rock. Typically, 20 to 35 percent of the surface is covered with cobbles. The surface layer is light brownish gray cobbly sandy loam about 4 inches thick. The subsoil is brown clay about 17 inches thick. Hard, fractured bedrock is at a depth of 21 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of this Oppio soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Rezave soil is shallow and well drained. It formed in residuum dominantly of basalt. Typically, 15 to 50 percent of the surface is covered with stones. The surface layer is light brownish gray extremely stony very fine sandy loam about 4 inches thick. The subsoil is light yellowish brown stony clay about 9 inches thick. The substratum to a depth of 19 inches or more is yellow, weakly silica-cemented gravelly clay loam. Hard basalt bedrock is at a depth of 19 inches. Depth to bedrock ranges from 14 to 20 inches.

Permeability of the Rezave soil is slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop is exposed volcanic rock. It occurs as small peaks and ridges.

This unit is used as rangeland.

The present vegetation in most areas of the Oppio soil is mainly low sagebrush and Douglas rabbitbrush. The production of forage is limited by low precipitation, very low available water capacity, and restricted depth of the root zone over bedrock. The soil is rated as very poorly suited to rangeland seeding because of the very low available water capacity.

The present vegetation in most areas of the Rezave soil is mainly Bailey greasewood, spiny hopsage, and Indian ricegrass. The production of forage is limited by very low precipitation, restricted depth of the root zone over bedrock, and very low available water capacity. The soil is rated as very poorly suited to rangeland seeding because of the very low precipitation, the restricted depth of the root zone over bedrock, and the very low available water capacity of the surface layer.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the low strength, high clay content, and depth to bedrock. Suitable base material and an adequate wearing surface are needed. Deep cuts should be avoided because of the underlying bedrock.

The Oppio soil is in capability subclass VIs, nonirrigated. The Rezave soil is in capability subclass VIIs, nonirrigated.

230—Cradlebaugh loam. This very deep, poorly drained soil is on low terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 4,800 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 49 degrees F, and the average frost-free period is 100 to 105 days.

Typically, the surface layer is grayish brown loam about 10 inches thick. The upper 25 inches of the underlying material is light yellowish brown, light gray, and white, stratified silty clay loam through fine sandy loam. The lower part to a depth of 60 inches is pale brown sandy loam. Depth to weak silica cementation ranges from 18 to 24 inches.

Included in this unit are Lemm soils on alluvial fans at relatively higher elevations; Fettic soils, which occur as alluvial fan remnants; and Dressler soils on toe slopes of alluvial fans and near drainageways. The unit is about 5 percent Lemm soils, 5 percent Fettic soils, and 5 percent Dressler soils.

Permeability of this Cradlebaugh soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 12 to 24 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 12 to 24 inches in late winter or spring. This soil is occasionally flooded for brief to long periods in spring. This soil is slightly to moderately affected by sodium salts.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Seasonal flooding and the high water table are limitations to use as sites for dwellings. Seasonal flooding can be controlled only by major flood control structures. Lowering the water table through drainage improves suitability for use as sites for dwellings. The main limitations to use of this unit as septic tank absorption fields are flooding, the high water table, and moderately slow permeability. Dikes and channels that have outlets to bypass floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. Care is needed to avoid polluting the water supplies. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, flooding, and susceptibility of this soil to frost heaving. Drainage should be provided. Suitable material should be added to strengthen the base.

The present vegetation in most areas is mainly black greasewood, basin wildrye, and saltgrass. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is poor, mainly because of salinity and alkalinity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. Salt blocks should be placed in less accessible areas rather than near water and in easily accessible areas to insure uniform grazing.

This soil is in capability subclasses IVw, irrigated, and VIw, nonirrigated.

240—Updike loam. This very deep, moderately well drained soil is on low-lying, slightly concave lake terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is light gray loam about 2 inches thick. The subsoil is brown, pale brown, and light gray clay and sandy clay about 18 inches thick. The substratum to a depth of 63 inches or more is pale brown, stratified sandy clay loam, clay loam, and clay.

Included in this unit are Cradlebaugh soils, which occur as stringers in low-lying narrow channels; Sagouspe soils, on water-worked sand beaches; and Doten soils, near Playas and on clay dunes. The unit is about 8 percent Cradlebaugh soils, 5 percent Sagouspe soils, and 2 percent Doten soils.

Permeability of this Updike soil is very slow. Available water capacity is high. Effective rooting depth is 72 inches for water-tolerant plants but is limited to 60 to 72 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 60 to 72 inches in late winter and spring. This soil is affected by sodium salts.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the high clay content. The high clay content can cause high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the very slowly permeable subsoil. This limitation can be reduced by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

Low load-bearing strength and high clay content are the main limitations to use of this unit as sites for roads. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly black greasewood, shadscale, and cheatgrass. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is poor, mainly because of salinity and alkalinity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. Salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas to insure uniform grazing.

This soil is in capability subclass VIIs, nonirrigated.

241—Updike loam, gravelly substratum. This very deep, moderately well drained soil is on low-lying, slightly concave lake terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is light gray loam about 2 inches thick. The subsoil and upper part of the substratum are mainly pale brown clay about 34 inches thick. The next 11 inches of the substratum is pale brown sandy clay loam. The lower part to a depth of 63 inches is stratified gravelly sandy loam and very gravelly sand.

Included in this unit are Cradlebaugh soils that occur as stringers in low-lying, narrow channels; Sagouspe soils on water-worked sand beaches; and Doten soils near playas and on clay dunes. The unit is about 8 percent Cradlebaugh soils, 5 percent Sagouspe soils, and 2 percent Doten soils.

Permeability of this Updike soil is very slow in the subsoil and upper part of the substratum and very rapid in the lower part of the substratum. Available water capacity is high. Effective rooting depth is greater than 60 inches for water-tolerant plants but is limited to 48 to 72 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The seasonal high water table is at a depth of 48 to 72 inches in spring and summer. This soil is subject to flooding during prolonged storms of high intensity. This soil is affected by sodium salts.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding and the high clay content, which results in a high shrink-swell potential, are limitations to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented if foundations are properly designed and the

soil near buildings is kept dry by diverting water away from it.

The main limitations for septic tank absorption fields are the very slowly permeable subsoil and upper part of the substratum and the very rapidly permeable lower part of the substratum. The limitation imposed by very slow permeability can be reduced by increasing the size of the absorption field. Absorption fields should be designed so that the leach lines are not placed into the very rapidly permeable layers. The leachate can move through the very rapidly permeable material and into the ground water or into nearby surface water before it is sufficiently purified.

The main limitations to use of this unit as sites for roads are low load-bearing strength and high clay content. If roads are built across areas of this soil, suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas of this soil is mainly grass. Under a good management system, this soil will produce yields of 6 animal-unit-months per acre of pasture. Shallow-rooted, water-tolerant plants are suited to this soil. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for pasture. The high water table limits the leaching of salts from the surface layer. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations and to improve forage production. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali in the surface layer.

This soil is in subclasses IVs, irrigated, and VIIs, nonirrigated.

250—Cassiro gravelly sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is brown gravelly sandy loam about 15 inches thick. The subsoil is brown very gravelly sandy clay about 30 inches thick. The substratum to a depth of 60 inches or more is stratified dense interbedded tuff, silt, ash, and valley fill.

Included in this unit are Indian Creek soils on terrace remnants, Oest soils near uplands on alluvial fan collars, Northmore soils on low, smooth alluvial fans, and wet areas that occur as seeps. The unit is about 5 percent Indian Creek soils, 4 percent Oest soils, 4 percent Northmore soils, and 2 percent wet areas.

Permeability of this Cassiro soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 40 to 60 inches and is limited by the dense substratum. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

The high clay content is a moderate limitation to use of this unit as sites for dwellings. The high clay content can cause moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water so that the soil near buildings is kept dry. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

A moderate limitation to use of this unit as sites for roads is the high clay content. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by the moderately low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because of the moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil in in capability subclasses IIe, irrigated, and VIc, nonirrigated.

251—Cassiro gravelly sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is brown gravelly sandy loam about 12 inches thick. The subsoil is brown very gravelly sandy clay about 28 inches thick. The substratum to a depth of 60 inches or more is stratified dense interbedded tuff, silt, ash, and valley fill.

Included in this unit are Indian Creek soils on terrace remnants, Oest soils near uplands on alluvial fan collars, Northmore soils at higher elevations, and wet areas that occur as seeps. The unit is about 6 percent Indian Creek soils, 5 percent Oest soils, 2 percent Northmore soils, and 2 percent wet areas.

Permeability of this Cassiro soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 40 to 60 inches and is limited by the dense substratum. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, a moderate limitation to use as sites for dwellings is the high clay content. The high clay content can cause moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

The high clay content is a moderate limitation to use of this soil as sites for roads. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by the moderately low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because of the moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVe, irrigated, and VIc, nonirrigated.

252—Cassiro gravelly sandy loam, 8 to 15 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is brown gravelly sandy loam about 13 inches thick. The subsoil is brown very gravelly sandy clay about 27 inches thick. The substratum to a depth of 60 inches or more is stratified dense interbedded tuff, silt, ash, and valley fill.

Included in this unit are Indian Creek soils on terrace remnants, Oest soils near uplands on higher alluvial fan skirts, Northmore soils at higher elevations, and wet areas that occur as seeps. The unit is about 6 percent Indian Creek soils, 5 percent Oest soils, 2 percent Northmore soils, and 2 percent wet areas.

Permeability of this Cassiro soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 40 to 60 inches and is limited by the dense substratum. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, moderate limitations for construction of dwellings are the steepness of slope and high clay content. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Steepness of slope and high clay content are moderate limitations to use of this unit as sites for roads. Suitable material should be added to provide an adequate wearing surface. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebursh, littleleaf horsebrush, and Indian ricegrass. The production of forage is limited by the moderately low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because of the moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush should encourage the growth of desirable forage grasses.

This soil is in capability subclass VIc, nonirrigated.

260—Acrelane-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 65 percent Acrelane very stony sandy loam, 15 to 50 percent slopes, and 25 percent Rock outcrop. The Acrelane soil is on rolling uplands, and the Rock outcrop is on ridgetops and crests. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Verdico Variant soils on slightly concave slopes and in shallow depressions, Graufels soils at higher elevations near Rock outcrop, and Surgem soils on lower colluvial slopes. The unit is about 3 percent Verdico Variant soils, 4 percent Graufels soils, and 3 percent Surgem soils.

The Acrelane soil is shallow and well drained. It formed in residuum derived dominantly from granodiorite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 6 inches thick. The subsoil is brown very gravelly sandy clay loam about 4 inches thick. Weathered granodiorite is at a depth of 10 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Acrelane soil is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granodioritic rock.

This unit is used for urban development and as rangeland. It has the potential to be used as juniper woodland.

If this unit is used for urban development, steepness of slope is the main limitation to use as sites for dwellings. The main limitations to use of this unit as septic tank absorption fields are the shallowness of the soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

Steepness of slope is the main limitation to use of this unit as sites for roads. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. Scattered throughout the areas is a small amount of juniper. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the distribution of rock outcrops, and the shallowness of the root zone. Steepness of slope limits access to grazing land by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

Where the unit is used as woodland, a mature stand of trees (80 to 100 years) will yield about 4 to 8 cords of wood per acre.

The soil in this unit is in capability subclass VIIs, nonirrigated.

262—Acrelane very stony sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from granodiorite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 4 inches thick. The subsoil is brown very gravelly sandy clay loam about 6 inches thick. Weathered granodiorite is at a depth of 10 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Included in this unit are Verdico Variant soils on slightly concave slopes and in shallow depressions, Surgem soils on lower colluvial slopes, Graufels soils at higher elevations near Rock outcrop, and Rock outcrop. The unit is about 4 percent Verdico Variant soils, 4 percent Surgem soils, 4 percent Graufels soils, and 3 percent Rock outcrop.

Permeability of this Acrelane soil is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This unit is used for urban development and as rangeland. It has the potential to be used as juniper woodland.

If this unit is used for urban development, moderate limitations to construction of dwellings are the steepness of slope, depth to bedrock, and stones. Heavy equipment is needed to cut into the bedrock and to excavate the large stones. The main limitation to use of this unit as septic tank absorption fields is the shallowness of the soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize this limitation. If the density of housing is too high, however, community sewage systems are needed.

Depth to bedrock, steepness of slope, and susceptibility of the soil to frost heaving are moderate limitations to use of this unit as sites for roads. Drainage should be provided. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. Scattered throughout the areas is a small amount of juniper. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because the available water capacity is very low and the root zone is shallow. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

Where the soil is used as woodland, a mature stand of trees (80 to 100 years) will yield about 4 to 8 cords of wood per acre.

This soil is in capability subclass VIIs, nonirrigated.

280—Wedekind gravelly loam, 8 to 15 percent slopes. This shallow, well drained soil is on uplands. It formed in colluvium and residuum derived dominantly from andesite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is brown gravelly loam about 2 inches thick. The subsoil is brown sandy clay loam about 12 inches thick. Highly weathered andesite is at a depth of 14 inches. Depth to highly weathered bedrock ranges from 10 to 20 inches.

Included in this unit are Mizel soils on rounded ridges and hilltops, Flex soils on convex south-facing slopes, Holbrook soils on small alluvial fans at the mouth of canyons, and Rock outcrop. The unit is about 4 percent Mizel soils, 4 percent Flex soils, 4 percent Holbrook soils, and 3 percent Rock outcrop.

Permeability of this Wedekind soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The shallowness of this soil over bedrock, the steepness of slope, and the high clay content are moderate limitations to use of this unit as sites for dwellings. Heavy equipment is needed to cut into the bedrock. The high clay content can cause moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation for septic tank absorption fields is depth to bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations; if the density of housing is too high, however, community sewage systems are needed.

Moderate limitations to use of this unit as sites for roads are shallowness over bedrock, steepness of slope, and the susceptibility of this soil to frost heaving. Roads should be provided with drainage. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and muleears. The production of forage is limited by the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because the depth of the root zone is restricted over bedrock and the available water capacity is very low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

281—Wedekind gravelly loam, 15 to 30 percent slopes. This shallow, well drained soil is on uplands. It formed in colluvium and residuum derived dominantly from andesite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is brown gravelly loam about 2 inches thick. The subsoil is brown sandy clay loam about 12 inches thick. Highly weathered andesite is at a depth of 14 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Included in this unit are Mizel soils on rounded ridges and hilltops, Flex soils on convex south-facing slopes, and Tristan soils on concave north-facing slopes. The unit is about 5 percent Mizel soils, 5 percent Flex soils, and 5 percent Tristan soils.

Permeability of this Wedekind soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the shallowness of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor because slope is steep, the available water capacity is very low, and the depth to the root zone is restricted. Steepness of slope

limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIe, nonirrigated.

282—Wedekind gravelly sandy loam, 30 to 50 percent slopes. This shallow, well drained soil is on uplands. It formed in colluvium and residuum derived dominantly from andesite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is brown gravelly sandy loam about 4 inches thick. The subsoil is brown sandy clay loam about 10 inches thick. Highly weathered andesite is at a depth of 14 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Included in this unit are Mizel soils on rounded ridges and on hilltops, Flex soils on slightly convex south-facing slopes, Tristan soils on concave north-facing slopes at higher elevations, and Rock outcrop. The unit is about 5 percent Mizel soils, 4 percent Flex soils, 4 percent Tristan soils, and 2 percent Rock outcrop.

Permeability of this Wedekind soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the shallowness of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this soil as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor because slope is steep, the available water capacity is very low, and the root zone is shallow. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIe, nonirrigated.

290—Verdico Variant stony sandy loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum and colluvium derived dominantly from granodiorite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 5 inches thick. The subsoil is brown gravelly clay about 23 inches thick. Highly weathered and fractured granodiorite is at a depth of 28 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Included in this unit are Acrelane soils along ridges and on convex slopes, Surgem soils on lower colluvial slopes, and Rock outcrop that occurs as isolated peaks. The unit is about 6 percent Acrelane soils, 6 percent Surgem soils, and 3 percent Rock outcrop.

Permeability of this Verdico Variant soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the high clay content. The high clay content can cause high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this unit as septic tank absorption fields are restricted depth to bedrock and the slowly permeable soil. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush and Douglas rabbitbrush. The production of forage is limited by the moderately low precipitation, low available water capacity, high clay content, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor, mainly because of the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

291—Verdico Variant very stony sandy loam, 15 to 30 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum and colluvium derived dominantly from granodiorite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature us 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 6 inches thick. The subsoil is brown gravelly clay about 22 inches thick. Highly weathered and fractured granodiorite is at a depth of 28 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Included in this unit are Acrelane soils along ridges and on convex slopes, Surgem soils on lower colluvial slopes, and Rock outcrop. The unit is about 6 percent Acrelane soils, 6 percent Surgem soils, and 3 percent Rock outcrop.

Permeability of this Verdico Variant soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

Steepness of slope and the high clay content are the main limitations to use of this unit as sites for dwellings. The high clay content can cause high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water so that the soil near buildings is kept dry.

The main limitations to use of this unit as septic tank absorption fields are the restricted depth to bedrock, the slowly permeable subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, high clay content, and steepness of slope. Suitable material should be added to strengthen the base and provide an adequate wearing surface. If possible, roads should be located in less sloping areas to minimize cutting filling and to reduce erosion.

The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, the shallowness of the root zone over bedrock, high clay content, and low available water capacity. The suitability of this soil for rangeland seeding is poor, mainly because of the abrupt textural boundary and steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

300—Surgem stony sandy loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum and colluvium derived dominantly from granodiorite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 4 inches thick. The subsoil is brown very cobbly clay about 20 inches thick. Unweathered bedrock is at a depth of 24 inches. Depth to hard, fractured, unweathered bedrock ranges from 20 to 30 inches.

Included in this unit are Acrelane soils on ridges and convex slopes, Verdico Variant soils on concave slopes and in shallow depressions, and Rock outcrop that occurs as small peaks. The unit is about 6 percent Acrelane soils, 6 percent Verdico Variant soils, and 3 percent Rock ouctrop.

Permeability of this Surgem soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

Stoniness is the main limitation to use of this unit as sites for dwellings. Heavy equipment is needed to excavate the large stones. The main limitations to use of this unit as septic tank absorption fields are restricted depth to bedrock and the large stones in the subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these

limitations. If the density of housing is too high, however, community sewage systems are needed. The large stones in the soil make preparing sites for absorption fields more difficult and also decrease the suitability of the soil for use as a filter.

The main limitation to use of this unit as sites for roads is stoniness. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush, Douglas rabbitbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation, very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because the available water capacity is very low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

301—Surgem-Rock outcrop complex, 15 to 30 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 75 percent Surgem stony sandy loam, 15 to 30 percent slopes, and 10 percent Rock outcrop. The Surgem soil is on side slopes of uplands, and the Rock outcrop is on ridges and peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Acrelane soils on ridges and convex slopes, Verdico Variant soils on concave slopes and in shallow depressions, and Graufels soils near Rock outcrop. The unit is about 6 percent Acrelane soils, 6 percent Verdico Variant soils, and 3 percent Graufels soils.

The Surgem soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from granodiorite. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 5 inches thick. The subsoil is brown very cobbly clay about 19 inches thick. Hard, fractured, unweathered bedrock is at a depth of 24 inches. Depth to unweathered bedrock ranges from 20 to 30 inches.

Permeability of the Surgem soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed granodiorite as small peaks or ridges.

This unit is used for urban development and as rangeland.

Steepness of slope and stones are the main limitations to use of the unit as sites for dwellings. Heavy equipment is needed to excavate the large stones. The main limitations to use of this unit as septic tank absorption fields are the restricted depth to bedrock in this Surgem soil, large stones in the subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed. Large stones in the soil make preparing sites for absorption fields more difficult and also decrease the suitability of the soil for use as a filter.

The main limitations for construction of roads are steepness of slope and stones. An adequate wearing surface is needed. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly low sagebrush, Douglas rabbitbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation, very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of the soil for rangeland seeding is very poor, mainly because of the very low available water capacity and steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

The soil in this unit is in capability subclass VIIs, nonirrigated.

302—Surgem-Rock outcrop complex, 30 to 50 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 65 percent Surgem stony sandy loam, 30 to 50 percent slopes, and 20 percent Rock outcrop. The Surgem soil is on side slopes of uplands, and Rock outcrop is on ridges and peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Acrelane soils near peaks and convex slopes, Verdico Variant soils on concave slopes and in shallow depressions, and Graufels soils near Rock outcrop. The unit is about 6 percent Acrelane soils,

6 percent Verdico Variant soils, and 3 percent Graufels soils.

The Surgem soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from granodiorite. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 6 inches thick. The subsoil is brown very cobbly clay about 18 inches thick. Hard, fractured, unweathered bedrock is at a depth of 24 inches. Depth to unweathered bedrock ranges from 20 to 30 inches.

Permeability of the Surgem soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed granodiorite as small peaks or ridges.

This unit is used for urban development and as rangeland.

If the Surgem soil is used for urban development, the main limitations to use as sites for dwellings are the steepness of slope and stones. Heavy equipment is needed to excavate the large stones. The main limitations for septic tank absorption fields are the restricted depth over bedrock, the steepness of slope, and large stones in the subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed. Large stones in the soil make preparing sites for absorption fields more difficult and also decrease the suitability of the soil for use as a filter.

The main limitations to use of this unit as sites for roads are steepness of slope and stones. Suitable material should be added to provide an adequate wearing surface. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly low sagebrush, Douglas rabbitbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation, very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor. The low available water capacity and steepness of slope are the main limitations. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

310—Risley-Rock outcrop complex, 8 to 15 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 75 percent Risley very stony loam, 8 to 15 percent slopes, and 15 percent Rock outcrop. The Risley soil is on side slopes of uplands, and the Rock outcrop is on ridges and peaks. The components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Old Camp soils near Rock outcrop, Mizel soils on rounded ridges and hilltops, Indiano soils on concave slopes at higher elevations, and Xman soils on slightly convex south- and west-facing slopes. This unit is about 3 percent Old Camp soils, 3 percent Mizel soils, 3 percent Indiano soils, and 1 percent Xman soils.

The Risley soil is moderately deep and well drained. It formed in residuum dominantly of altered, weathered andesite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light gray very stony loam about 4 inches thick. The subsoil is brown clay about 20 inches thick. Weathered, altered andesite is at a depth of 24 inches. Depth to weathered, altered andesite ranges from 20 to 30 inches.

Permeability of the Risley soil is slow. Available water capacity is low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed andesite on small peaks and on ridges.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is the high clay content of the soil, which results in high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The restricted depth of the soil over bedrock and the slowly permeable subsoil are the main limitations to use of this soil as septic tank absorption fields. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and high clay content. If roads are built across areas of this unit, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas of this soil is mainly big sagebrush and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the restricted depth of the root zone over bedrock, the low available water capacity, and moderately low precipitation. The suitability of this soil for rangeland seeding is poor. The main limitation for seeding is the distribution of Rock outcrop. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

311—Risley-Rock outcrop complex, 15 to 30 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 65 percent Risley very stony loam, 15 to 30 percent slopes, and 25 percent Rock outcrop. The Risley soil is on side slopes of uplands, and Rock outcrop is on ridges and peaks. The components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Old Camp soils near Rock outcrop, Mizel soils on rounded ridges and hilltops, Indiano soils on concave slopes at higher elevations, and Xman soils on slightly convex south- and west-facing slopes. This unit is about 3 percent Old Camp soils, 3 percent Mizel soils, 2 percent Indiano soils, and 2 percent Xman soils.

The Risley soil is moderately deep and well drained. It formed in residuum dominantly of altered, weathered andesite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light gray very stony loam about 3 inches thick. The subsoil is brown clay about 20 inches thick. Weathered, altered andesite is at a depth of 23 inches. Depth to weathered, altered andesite ranges from 20 to 30 inches.

Permeability of the Risley soil is slow. Available water capacity is low. Effective rooting depth is 20 to 30 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed andesite on small peaks and on ridges.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for dwellings are the steepness of slope and high clay content of the soil, which results in high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this unit as septic tank absorption fields are depth to bedrock, slowly permeable subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Designs that increase the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are low load-bearing strength, steepness of slope, and high clay content. If roads are built across areas of this unit, suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the restricted depth of the root zone over bedrock, the low available water capacity, and moderately low precipitation. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the distribution of Rock outcrop and steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed to avoid overgrazing and ensure that enough vegetation is left to protect the unit from excessive erosion. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

312—Risley cobbly loam, 15 to 30 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum derived dominantly from altered, weathered andesite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 35 percent of the surface is covered with cobbles. The surface layer is light gray cobbly loam about 3 inches thick. The subsoil is brown clay about 20 inches thick. Weathered, altered andesite is at a depth of 23 inches. Depth to weathered, altered andesite ranges from 20 to 30 inches.

Included in this unit are Old Camp soils which occur near Rock outcrop, Mizel soils which occur on rounded ridges and hilltops, Rock outcrops that occur as isolated peaks, and Indiano soils on concave slopes at higher elevations. This unit is about 4 percent Old Camp soils, 4 percent Mizel soils, 4 percent Rock outcrop, and 3 percent Indiano soils.

Permeability of the Risley soil is slow. Available water capacity is low. Effective rooting depth is 20 to 30 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for dwellings are the steepness of slope and the high clay content of the soil, which results in high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this unit as septic tank absorption fields are depth to bedrock, the slowly permeable subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Designs that increase the volume of soil used for filtering can minimize the limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this soil as sites for roads are low load-bearing strength, steepness of slope, and high clay content. If roads are built across areas of this unit, suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the restricted depth of the root zone over bedrock, the low available water capacity, and moderately low precipitation. The suitability of this soil for rangeland seeding is poor because of steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed to avoid overgrazing and insure that enough vegetation is left to protect the unit from excessive erosion erosion. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

313—Risley cobbly clay loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum derived dominantly from altered, weathered andesite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 35 percent of the surface is covered with cobbles. The surface layer is light gray cobbly clay loam about 4 inches thick. The subsoil is brown clay about 36 inches thick. Weathered, altered andesite is a depth of 40 inches. Depth to weathered, altered andesite ranges from 20 to 40 inches.

Included in this unit are Old Camp soils near Rock outcrop, Mizel soils on rounded ridges and hilltops, Rock outcrop that occurs as isolated peaks, and Indiano soils on concave slopes at higher elevations. This unit is about 4 percent Old Camp soils, 4 percent Mizel soils, 4 percent Rock outcrop, and 3 percent Indiano soils.

Permeability of the Risley soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is the high clay content of the soil, which results in high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this unit as septic tank absorption fields are restricted depth over bedrock and the slowly permeable subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent could surface downslope or seep through cracks of the rock into the ground water. Designs that would increase the volume of soil used for filtering could minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content of the soil. If roads are built across areas of this unit, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the restricted depth of the root zone over bedrock, the moderate available water capacity, and moderately low precipitation. The suitability of this soil for rangeland seeding is fair because of moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed to insure that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

314—Risley-Xman-Rock outcrop association. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 8 to 12 inches, the

average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 40 percent Risley cobbly loam, 15 to 30 percent slopes; 30 percent Xman very stony loam, 4 to 30 percent slopes; and 15 percent Rock outcrop. The Risley soil is on north-facing, colluvial slopes. Xman soil is near ridges and mountain tops, and Rock outcrop is on peaks and ridges.

Included in this unit are Old Camp soils near Rock outcrop, Mizel soils on rounded ridges and hilltops, Arzo soils on lower colluvial slopes, and Indiano soils on concave slopes at higher elevations. The unit is about 4 percent Old Camp soils, 4 percent Mizel soils, 4 percent Arzo soils, and 3 percent Indiano soils.

The Risley soil is moderately deep and well drained. It formed in residuum dominantly of altered, weathered andesite. The surface layer is brown cobbly loam about 6 inches thick. The subsoil is yellowish brown clay about 22 inches thick. Weathered, altered andesite is at a depth of 28 inches. Depth to weathered, altered andesite ranges from 20 to 30 inches.

Permeability of the Risley soil is slow. Available water capacity is low. Effective rooting depth is 20 to 30 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Xman soil is shallow and well drained. It formed in residuum dominantly of volcanic rocks. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 3 inches thick. The subsoil is brown clay about 11 inches thick. Weathered, altered andesite is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

Rock outcrop consists of barren andesitic rocks on ridges and peaks.

This unit is used as rangeland.

The present vegetation in most areas of this Risley soil is mainly big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of the soil for rangeland seeding is fair. The main limitations for seeding are low available water capacity and the restricted depth of the root zone over bedrock.

The present vegetation in most areas of this Xman soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by low precipitation, very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the restricted depth of the root zone over bedrock.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit is from excessive erosion.

The main limitations to use of this unit as sites for roads are low load-bearing strength, high shrink-swell potential, and steepness of slope. Suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

341—Yuko stony loam, 15 to 30 percent slopes. This very shallow, well drained soil is on uplands. It formed in residuum derived dominantly from volcanic rock. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 0.1 to 3 percent of the surface is covered with stones. The surface layer is brown stony loam about 2 inches thick. The subsoil is yellowish brown silty clay loam about 6 inches thick. Highly weathered andesite is at a depth of 8 inches. Depth to weathered bedrock ranges from 6 to 14 inches.

Included in this unit are Oppio soils on slightly concave slopes and in shallow depressions, Koontz soils on east- and north-facing slopes, and Rock outcrop that occurs as ridges and peaks. The unit is about 6 percent Oppio soils, 6 percent Koontz soils, and 3 percent Rock outcrop.

Permeability of this Yuko soil is moderately slow. Available water capacity is very low. Effective rooting depth is 6 to 14 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the steepness of slope.

The main limitation to use of this unit as septic tank absorption fields are the restricted depth to bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads is the steepness of slope. If possible, roads should

be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and green ephedra. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the shallowness of the root zone over bedrock. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

342—Yuko-Reywat-Rock outcrop association. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the average air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 35 percent Yuko very stony loam, 15 to 50 percent slopes; 25 percent Reywat extremely stony loam, 15 to 50 percent slopes; and 25 percent Rock outcrop. The Yuko soil is on south- and west-facing slopes near ridges and hilltops. The Reywat soil is on north- and east-facing slopes. Rock outcrop is on peaks and ridges.

Included in this unit are Oppio soils on slightly concave slopes and in shallow depressions, Old Camp soils near Rock outcrop, Hefed soils on lower colluvial slopes, and Duco soils on convex ridges at higher elevations. The unit is about 4 percent Oppio soils, 4 percent Old Camp soils, 4 percent Hefed soils, and 3 percent Duco soils.

The Yuko soil is very shallow and well drained. It formed in residuum mainly of volcanic rock. Typically, 3 to 15 percent of the surface is covered with stones and some cobbles. The surface layer is brown very stony loam about 3 inches thick. The subsoil is yellowish brown silty clay loam about 6 inches thick. Depth to highly weathered andesite ranges from 6 to 14 inches.

Permeability of the Yuko soil is moderately slow. Available water capacity is very low. Effective rooting depth is 6 to 14 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Reywat soil is shallow and well drained. It formed mainly in residuum of basic igneous rocks. Typically, 15 to 50 percent of the surface is covered with stones and some cobbles. The surface layer is a grayish brown extremely stony loam about 6 inches thick. The subsoil is brown very gravelly clay loam about 8 inches thick. Fractured, hard bedrock is at a depth of 14 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Reywat soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

Rock outcrop consists of barren volcanic rock on ridges and peaks.

This unit is used as rangeland.

The present vegetation in most areas of the Yuko soil is mainly big sagebrush, Anderson peachbrush, and green ephedra. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and steepness of slope.

The present vegetation in most of the Reywat soil is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because the available water capacity is very low and slope is steep.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the shallowness over bedrock of the Reywat soil and the steepness of slope of both soils. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

350—Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes. This very shallow, well drained soil is on uplands. It formed in residuum dominantly of rhyolite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 50 to 60 percent of the surface is covered with gravel. The surface layer is very pale brown very gravelly coarse sandy loam about 3 inches thick. Bedrock is at a depth of 3 inches. Depth to hard rhyolite ranges from 3 to 10 inches.

Included in this unit are Pahrange soils on smooth, slightly concave, higher slopes; Lemm soils on short alluvial fans and on lower, colluvial slopes; Verdico Variant soils in shallow depressions; and Rock outcrop that occurs on ridges. The unit is about 4 percent

Pahrange soils, 4 percent Lemm soils, 4 percent Verdico Variant soils, and 3 percent Rock outcrop.

Permeability of this Mizel soil is moderate. Available water capacity is very low. Effective rooting depth is 3 to 10 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If the unit is used for urban development, the main limitations for construction of dwellings are the steepness of slope and depth to bedrock. Heavy equipment is needed to cut into the bedrock.

The main limitations for use of this soil as septic tank absorption fields are the shallowness of the soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks in the rock into the ground water. In some areas, increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations for roads are depth to bedrock and steepness of slope. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The present vegetation in most areas is mainly Douglas rabbitbrush and bottlebrush squirreltail. The production of forage is limited by very low available water capacity and the restricted depth of the root zone over bedrock. The rating for rangeland seeding is very poor because of steepness of slope, very low available water capacity, and the restricted depth of the root zone over bedrock. Steepness of slope limits access by livestock and promotes overgrazing on the less sloping areas. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

351—Mizel-Skedaddle-Rock outcrop association. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 40 percent Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes; 35 percent Skedaddle very stony loam, 15 to 70 percent slopes; and 10 percent Rock outcrop. The Mizel soil is on eroded, south-facing slopes. The Skedaddle soil is on eroded, north- and east-facing slopes. The Rock outcrop is on small peaks and ridges.

Incuded in this unit are Pahrange soils on smooth and slightly concave slopes, Zephan soils on lower colluvial slopes, Duco soils on ridges at higher elevations, and Lemm soils on short alluvial and colluvial slopes. The unit is about 4 percent Pahrange soils, 4 percent Zephan soils, 4 percent Duco soils, and 3 percent Lemm soils.

The Mizel soil is very shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 50 to 60 percent of the surface is covered with gravel. The surface layer is very pale brown very gravelly coarse sandy loam about 3 inches thick. Bedrock is at a depth of 3 inches. Depth to hard rhyolite ranges from 3 to 10 inches.

Permeability of this Mizel soil is moderate. Available water capacity is very low. Effective rooting depth is 3 to 10 inches. Runoff is rapid, and the hazard water erosion is high. The hazard of soil blowing is slight.

The Skedaddle soil is very shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, 3 to 5 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 5 inches thick. Weathered bedrock is at a depth of 5 inches. Depth to hard bedrock ranges from 4 to 12 inches.

Permeability of the Skedaddle soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 12 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of barren rock as small peaks and ridges.

The soils in this unit are used as rangeland.

The present vegetation in most areas of the Mizel soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, steepness of slope, and shallowness of the root zone.

The present vegetation in most areas of the Skedaddle soil is mainly big sagebrush, green ephedra, and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, steepness of slope, and the shallowness of the root zone over bedrock.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are the shallowness of the soils over bedrock and the steepness of slope. Deep cuts should be avoided

because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

360—Pits. Pits are open excavations from which soil and, in places, some of the bedrock, have been removed. The excavated material has been used as construction material. The underlying material is variable.

370—Lemm very gravelly coarse sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from granodiorite. Elevation is 4,700 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 44 to 50 degrees F, and the average frost-free period is 80 to 100 days.

Typically, 40 to 50 percent of the surface is covered with gravel. The surface layer is grayish brown very gravelly coarse sandy loam about 19 inches thick. The subsoil is pale brown very gravelly coarse sandy loam about 21 inches thick. The substratum to a depth of 60 inches or more is very pale brown very gravelly loamy coarse sand.

Included in this unit are Indian Creek soils on higher terrace remnants, Cassiro soils on higher alluvial fan remnants, and Greenbrae soils on toe slopes of alluvial fans. The unit is about 5 percent Indian Creek soils, 5 percent Cassiro soils, and 5 percent Greenbrae soils.

Permeability of this Lemm soil is moderately rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the moderately rapidly permeable subsoil. Because the subsoil is moderately rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Susceptibility to frost heaving limits the use of this unit for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush and antelope bitterbrush. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

390—Duckhill stony loam, 30 to 50 percent slopes. This very shallow, well drained soil is on mountainous uplands. It formed in residuum derived dominantly from altered volcanic rock. Elevation is 5,700 to 7,000 feet. The average annual precipitation is 14 to 25 inches, the average annual air temperature is 43 to 45 degrees F, and the average frost-free period is 50 to 80 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony loam about 3 inches thick. The subsoil is yellowish brown very gravelly light clay loam about 6 inches thick. Weathered bedrock is at a depth of 9 inches. Hard bedrock is at a depth of 12 inches. Depth to weathered bedrock ranges from 6 to 10 inches, and depth to hard bedrock ranges from 10 to 14 inches.

Included in this unit are Fraval soils on smooth, slightly concave slopes; Jumbo soils on colluvial north-facing slopes; and Rock outcrop that occurs as narrow ridges. The unit is about 5 percent Fraval soils, 5 percent Jumbo soils, and 5 percent Rock outcrop.

Permeability of this Duckhill soil is moderate. Available water capacity is very low. Effective rooting depth is 6 to 10 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as woodland.

The main limitations to use of this unit as sites for construction of dwellings are the steepness of slope and the shallowness of this soil over bedrock. Heavy equipment is needed to cut into the bedrock. The main limitations to use of this unit as septic tank absorption fields are the shallowness of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the shallowness of this soil over bedrock and steepness of slope. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of

merchantable timber is very low and natural regeneration of trees is difficult because of marginal precipitation, shallowness of this soil, and plant competition. If the woodland is to be maintained, only selective harvesting should be practiced. The steepness of slope limits the kinds of equipment that can be used in forest management. Management that minimizes the risk of erosion is essential in harvesting timber.

This soil is in capability subclass VIIs, nonirrigated.

391—Duckhill-Hirschdale-Fraval association. This map unit is on mountainous uplands. Elevation is 6,000 to 8,500 feet. The average annual precipitation is 20 to 45 inches, the average annual air temperature is 43 to 45 degrees F, and the average frost-free period is 50 to 60 days.

This unit is 35 percent Duckhill stony loam, 30 to 50 percent slopes; 30 percent Hirschdale very stony loam, 15 to 50 percent slopes; and 20 percent Fraval very stony loam, 30 to 50 percent slopes. The Duckhill soil is on steep uplands. The Hirschdale soil is on smooth slopes of uplands. The Fraval soil is on slightly convex slopes of uplands.

Included in this map unit are Duckhill Variant soils on steep ridges and peaks near Rock outcrop; Jumbo soils on lower, north-facing, colluvial slopes; Macareeno soils near streams and seeps; and Rock outcrop that occurs as small peaks and narrow ridges. The unit is about 4 percent Duckhill Variant soils, 4 percent Jumbo soils, 3 percent Macareeno soils, and 4 percent Rock outcrop. Also included near the California state line are small areas of Meiss soils on rims.

The Duckhill soil is very shallow and well drained. It formed in residuum dominantly of volcanic rock. Slope is 30 to 50 percent. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony loam about 3 inches thick. The subsoil is yellowish brown very gravelly light clay loam about 6 inches thick. Weathered, altered andesite is at a depth of 9 inches. Depth to weathered bedrock ranges from 6 to 10 inches, and depth to hard bedrock ranges from 10 to 14 inches.

Permeability of the Duckhill soil is moderate. Available water capacity is very low. Effective rooting depth is 6 to 10 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Hirschdale soil is moderately deep and well drained. It formed in residuum dominantly of volcanic rock. Slope is 15 to 50 percent. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony loam about 6 inches thick. The subsoil is reddish brown clay about 33 inches thick. Weathered bedrock is at a depth of 39 inches. Depth to weathered bedrock ranges from 20 to 40 inches. Depth to hard bedrock ranges from 40 to 80 inches.

Permeability of the Hirschdale soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Fraval soil is moderately deep and well drained. It formed in residuum dominantly of volcanic rock. Slope is 30 to 50 percent. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is dark grayish brown very stony loam about 9 inches thick. The subsoil is brown very gravelly loam about 18 inches thick. Weathered tuff is at a depth of 27 inches. Depth to weathered tuff ranges from 20 to 40 inches.

Permeability of the Fraval soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation on the Duckhill soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of merchantable timber is very low, and natural regeneration of trees is difficult because of marginal precipitation, shallowness of soil, and plant competition. If the woodland is to be maintained, only selective harvesting should be practiced. Management that minimizes the risk of erosion is essential. The steepness of slope limits the kind of equipment that can be used in forest management.

The present vegetation on the Hirschdale soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, mountainmahogany, muleears, and squawcarpet. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 3,300 cubic feet, or 14,400 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. The steepness of slope limits the kind of equipment that can be used in forest management.

The present vegetation on the Fraval soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and Sandberg bluegrass. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. The steepness of slope limits the kind of equipment that can be used in forest management.

The main limitations to the use of the unit as a site for roads are steepness of slope and depth to bedrock of the Duckhill soil, low strength, steepness of slope, and high clay content of the Hirschdale soil, and steepness of slope of the Fraval soil. Roads should be provided with a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided in the Duckhill soil because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

400—Jubilee Variant loamy sand, strongly saline. This very deep, poorly drained soil is on flood plains and alluvial fans. It formed in alluvium dominantly of granitic rock. Slopes are 0 to 2 percent. Elevation is 5,000 to 5,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is about 100 days.

Typically, the surface layer is very dark brown loamy sand about 14 inches thick. The underlying material to a depth of 60 inches is stratified sandy loam through loamy coarse sand.

Included in this map unit are Voltaire soils on low terrace remnants and Sagouspe soils near shallow channels. The unit is 8 percent Voltaire soils and 7 percent Sagouspe soils.

Permeability of this Jubilee Variant soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 18 to 36 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 18 to 36 inches in winter and spring. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks. This soil is moderately to strongly affected by sodium salts.

This unit is used for urban development and pasture.

Flooding is a limitation to use of the soil as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain.

The main limitation to use of the soil as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of the unit as sites for roads is the susceptibility of this soil to frost heaving. Drainage should be provided.

If this unit is used for unimproved pasture, the main limitations are salts, alkali, and the high water table. The present vegetation in most areas is mainly grass. An area-wide reclamation project would be beneficial if this unit is used for improved pasture or hayland. Wetness limits the choice of plants and the period of cutting or grazing and increases the risk of winterkill.

This soil is in capability subclasses IVw, irrigated, and VIIw, nonirrigated.

401—Jubilee Variant loamy sand, slightly saline. This very deep, poorly drained soil is on flood plains and alluvial fans. It formed in alluvium derived dominantly from granitic rock. Slopes are 0 to 2 percent. Elevation is 5,000 to 5,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is about 100 days.

Typically, the surface layer is very dark brown loamy sand about 14 inches thick. The underlying material to a depth of 60 inches is stratified sandy loam through loamy coarse sand.

Included in this unit are Voltaire soils on low terrace remnants and Sagouspe soils near shallow channels. The unit is about 8 percent Voltaire soils and 7 percent Sagouspe soils.

Permeability of the Jubilee Variant soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 18 to 36 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 18 to 36 inches in winter and spring. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks. The soil is slightly affected by sodium salts.

This unit is used for urban development and pasture.

Flooding is a limitation to use of this unit as sites for construction of dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this unit as sites for roads is the susceptibility of this soil to frost heaving. Roads should be provided with drainage.

If this unit is used for hay and pasture, the high water table and the concentration of salts and alkali are the main limitations. The present vegetation in most areas is mainly grass. Under a good management system, this soil will produce yields of 2 tons per acre of improved meadow hay or 6 animal-unit-months per acre of pasture. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for hay and pasture. Shallow-rooted, water-tolerant plants are suited to this soil. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations and to improve forage production. Applications of irrigation

water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali.

This soil is in capability subclass IVw, irrigated, and VIIw, nonirrigated.

403—Jubilee Variant loam, slightly saline. This very deep, poorly drained soil is on flood plains and alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Slopes are 0 to 2 percent. Elevation is 5,000 to 5,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is about 100 days.

Typically, the surface layer is very dark brown loam about 14 inches thick. The underlying material to a depth of 60 inches is stratified sandy loam through loamy coarse sand that is mottled and gleyed.

Included in this unit are Voltaire soils on low terrace remnants and Sagouspe soils near shallow channels. The unit is about 8 percent Voltaire soils and 7 percent Sagouspe soils.

Permeability of this Jubilee Variant soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants, but is limited to depths between 18 and 36 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 18 to 36 inches in winter and spring. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks. The soil is slightly affected by sodium salts.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this soil as sites for roads is the susceptibility of this soil to frost heaving. Roads should be provided with drainage.

If this unit is used for hay and pasture, a high water table and concentrations of salts and alkali are the main limitations. The present vegetation in most areas is mainly grass. Under a good management system, this soil will produce yields of 6 tons per acre of improved meadow hay or 2.5 animal-unit-months per acre of pasture. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for hay and pasture. Shallow-rooted, water-tolerant plants are suited to this soil. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations and to improve forage production. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali.

This soil is in capability subclasses IVw, irrigated, and VIw, nonirrigated.

410—Ophir loamy sand, 2 to 8 percent slopes. This very deep, poorly drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,700 to 5,400 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is very dark gray loamy sand about 11 inches thick. The underlying material to a depth of 60 inches is black and very dark gray loamy sand.

Included in this unit are Mottsville soils on the higher parts of alluvial fans and Jubilee soils on lower parts of alluvial fans and on flood plains. The unit is about 8 percent Mottsville soils and 7 percent Jubilee soils.

Permeability of this Ophir soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 20 to 40 inches for water-sensitive plants. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 20 to 40 inches in late winter and spring. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding is a severe limitation to use of this unit as sites for dwellings. Flash floods can occur during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitations to use of this unit as septic tank absorption fields are the high water table and the rapidly permeable underlying material. Absorption fields should be designed to avoid raising the existing water table and polluting the water supplies. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The high water table and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for hay and pasture, the main limitation is the high water table. The present vegetation in most areas is mainly grass. Under a good management system, this soil will produce yields of 2.5 tons per acre of improved meadow hay or 3 animal-unit-months per acre of pasture. Irrigation water must be carefully applied to avoid raising the water table. Shallow-rooted, water-tolerant plants are suited to this soil. Although the content of molybdenum in the soil does not reduce yields, the forage produced in some areas contains enough molybdenum to be toxic to livestock.

This soil is in capability subclass IIIw, irrigated.

411—Ophir loamy sand, 0 to 2 percent slopes. This very deep, poorly drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,700 to 5,400 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is black loamy sand about 12 inches thick. The underlying material to a depth of 60 inches is black and very dark gray, stratified gravelly coarse sand through sandy loam.

Included in this unit are Mottsville soils on the higher parts of alluvial fans and Jubilee soils on lower parts of alluvial fans and on flood plains. The unit is about 8 percent Mottsville soils and 7 percent Jubilee soils.

Permeability of this Ophir soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 20 to 40 inches for water-sensitive plants. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 20 to 40 inches in late winter and spring. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding is a severe limitation to use of this unit as sites for construction of dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitations to use of this unit as septic tank absorption fields are the high water table and the rapidly permeable underlying material. Absorption fields should be designed to avoid raising the existing water table and polluting the water supplies. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The high water table and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Drainage is needed. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for hay and pasture, the main limitation is the high water table. The present vegetation in most areas is mainly grass. Under a good management system, this soil will produce yields of 2.5 tons per acre of improved meadow hay or 3 animal-unit-months per acre of pasture. Irrigation water must be carefully applied to avoid raising the water table. Shallow-rooted, water-tolerant plants are suited to this soil. Although the content of molybdenum in this soil does not reduce yields, the forage produced in some areas contains enough molybdenum to be toxic to livestock.

This soil is in capability subclass IIIw, irrigated.

420—Godecke loamy sand. This very deep, somewhat poorly drained soil is on slightly concave to smooth terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,700 to 5,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown loamy sand about 5 inches thick. The subsoil is pale brown sandy clay loam about 10 inches thick. The substratum to a depth of 60 inches or more is stratified sandy loam through clay.

Included in this unit are Voltaire soils on flood plains; Dalzell soils on higher terrace remnants; Sagouspe Variant soils, which occur as narrow stringers near stream channels; and Incy soils on sand dunes. The unit is about 5 percent Voltaire soils, 5 percent Dalzell soils, 3 percent Sagouspe Variant soils, and 2 percent Incy soils.

Permeability of this Godecke soil is slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 36 to 60 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 30 to 40 inches in late winter and spring. The soil is slightly to moderately affected by sodium salts.

This unit is used for urban development and as rangeland.

The high clay content is a moderate limitation to use of this unit as sites for dwellings. The high clay content

results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitations to use of this unit as septic tank absorption fields are the high water table and the slowly permeable subsoil. Absorption fields should be designed to avoid raising the existing water table and polluting the water supplies. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field.

Low load-bearing strength is the main limitation to use of this soil as sites for roads. Suitable material should be added to strengthen the base.

The present vegetation in most areas is mainly black greasewood and saltgrass. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of salinity and alkalinity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. Salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas to insure uniform grazing.

This soil is in capability subclass VIIw, nonirrigated.

423—Godecke Variant loamy sand. This deep, moderately well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,700 to 5,200 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown loamy sand about 12 inches thick. The subsoil is light yellowish brown sandy clay loam about 13 inches thick. The upper 17 inches of the substratum is sandy clay loam with a few thin strata that are weakly silica cemented. The lower part to a depth of 60 inches is a strongly cemented hardpan. Depth to the strongly cemented hardpan ranges from 40 to 60 inches.

Included in this unit are Surprise soils on higher parts of alluvial fans and along drainageways and Dalzell soils on lower-lying terraces. The unit is about 8 percent Surprise soils and 7 percent Dalzell soils.

Permeability of this Godecke Variant soil is slow. Available water capacity is moderate. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 72 to 84 inches in late winter and spring. The soil is slightly affected by sodium salts.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

The high clay content is a moderate limitation to use of this unit as sites for dwellings. The high clay content can result in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

The high clay content and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Drainage is needed. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly black greasewood and saltgrass. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of salinity and alkalinity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

This soil is in capability subclasses IVs, irrigated, and VIIs, nonirrigated.

430—Sagouspe Variant loamy very fine sand. This very deep, poorly drained soil is on flood plains and lake terraces. It formed in sandy alluvium derived dominantly from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 5,000 to 5,100 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is dark gray loamy very fine sand about 5 inches thick. The upper 17 inches of the underlying material is light brown sand with many yellowish red mottles. The lower part to a depth of 60 inches is light greenish gray, stratified sand and silt loam.

Included in this unit are Ophir soils on lower flood plains and unnamed soils that occur on flood plains and have clay or silty clay underlying material. The unit is about 8 percent Ophir soils and 7 percent unnamed soils.

Permeability of this Sagouspe Variant soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 20 to 36 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 20 to 36 inches in winter, spring, and early summer. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding and the high water table are limitations to use of this unit as sites for dwellings. Lowering the water table through drainage improves suitability as sites for

dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to use of this unit as sites for roads are the high water table and the susceptibility of this soil to frost heaving. Drainage should be provided. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for hay and pasture, the main limitation is the high water table. The present vegetation in most areas is mainly grass. Under a good management system, this soil will produce yields of 2 tons per acre of improved meadow hay or 6 animal-unit-months per acre of pasture. Irrigation water must be carefully applied to avoid raising the water table. Shallow-rooted, water-tolerant plants are suited to this soil.

This soil is in capability subclasses IIIw, irrigated, and VIIw, nonirrigated.

431—Sagouspe Variant loamy very fine sand, wet. This very deep, poorly drained soil is on flood plains and lake terraces. It formed in sandy alluvium derived dominantly from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 5,000 to 5,100 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is dark gray loamy very fine sand about 5 inches thick. The upper 17 inches of the underlying material is light brown sand with many yellowish red mottles. The lower part to a depth of more than 60 inches is light greenish gray stratified sand and silt loam.

Included in this unit are Ophir soils on lower flood plains and unnamed soils that occur on flood plains and have clay or silty clay in the underlying material. The unit is about 8 percent Ophir soils and 7 percent unnamed soils.

Permeability of this Sagouspe Variant soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 6 to 20 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 6 to 20 inches in winter, spring, and early summer. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and unimproved pasture.

Flooding and the high water table are limitations to use of this unit as sites for dwellings. Lowering the water table through drainage improves suitability for use as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. It is difficult to establish and maintain structures for protection from such floods. The main limitation to use of this unit as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to use of this unit as sites for roads are the high water table and the susceptibility of this soil to frost heaving. Roads should be provided with drainage and an adequate wearing surface.

The present vegetation in most areas is mainly grass. If this unit is used for unimproved pasture, the main limitation is the high water table. An area-wide drainage project would be beneficial if this unit is used for improved pasture or hayland.

This soil is in capability subclass VIIs, nonirrigated.

440—Jubilee sandy loam. This very deep, poorly drained soil is on alluvial fans and flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,700 to 5,400 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, the surface layer is black sandy loam about 22 inches thick. The underlying material to a depth of 60 inches is mottled, grayish brown, stratified loamy coarse sand through fine sandy loam.

Included in this map unit are Ophir soils on lower-lying flood plains and Jubilee Variant soils on the lower parts of the unit. The unit is 8 percent Ophir soils and 2 percent Jubilee Variant soils.

Permeability of this Jubilee soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 20 to 30 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 20 to 30 inches in winter and spring. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks. This unit is used for urban development, crops, pasture, and hayland.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation for septic tank absorption

fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this unit as sites for roads is the susceptibility of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the high water table. Under good management, including a conservation cropping system, 3.5 tons per acre of alfalfa or 42 bushels per acre of barley can be expected. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid overirrigating and leaching of plant nutrients.

If this unit is used for hay and pasture, the main limitation is the high water table. The present vegetation in most areas is mainly grasses, juncus, sedges, and various clovers. Under a good pasture or hayland management system, yields of 3.5 tons per acre of alfalfa, 3 tons per acre of improved meadow hay, or 8 animal-unit-months per acre of pasture can be expected. Irrigation water must be carefully applied to avoid raising the water table. Shallow-rooted, water-tolerant plants are suited to this soil.

This soil is in capability subclass IIIw, irrigated.

441—Jubilee clay loam. This very deep, poorly drained soil is on alluvial fans and flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,700 to 5,400 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, the surface layer is very dark brown clay loam about 11 inches thick. The underlying material to a depth of 60 inches is stratified fine sandy loam through coarse sand.

Included in this unit are Ophir soils on lower lying flood plains and Jubilee Variant soils on the lower parts of the unit. The unit is about 8 percent Ophir soils and 7 percent Jubilee Variant soils.

Permeability of this Jubilee soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 20 to 30 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 20 to 30 inches in winter and spring. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development, crops, pasture, and hayland.

Flooding is a severe limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this unit as sites for roads is the susceptibility of this soil to frost heaving. Roads should be provided with drainage and an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the high water table. Under good management, including a conservation cropping system, this soil can produce 3.5 tons per acre of alfalfa or 42 bushels per acre of barley. Aplications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients.

If this unit is used for hay and pasture, the main limitation is the high water table. The present vegetation in most areas is mainly grasses, sedges, various clovers, and juncus. Under a good management system, this soil can produce yields of 3.5 tons per acre of alfalfa, 3 tons per acre of improved meadow hay, or 8 animal-unit-months per acre of pasture. Irrigation water must be carefully applied to avoid raising the water table.

This soil is in capability subclass IIIw, irrigated.

442—Jubilee gravelly sand. This very deep, poorly drained soil is on alluvial fans and flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,700 to 5,400 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, the surface layer is pale brown gravelly sand overwash about 11 inches thick. Below this is a buried surface layer of black sandy loam about 17 inches thick. The underlying material to a depth of 60 inches is olive gray, stratified loamy fine sand, sandy loam, and coarse sand.

Included in this unit are Voltaire soils in swales and Ophir soils on lower-lying flood plains. The unit is about 8 percent Voltaire soils and 7 percent Ophir soils.

Permeability of this Jubilee soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 20 to 30 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 20 to 30 inches in winter and spring. This soil is subject to flash flooding during storms

of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development, pasture, and hayland.

Flooding is a severe limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this soil as sites for roads is the susceptibility of this soil to frost heaving. Roads should be provided with drainage and an adequate wearing surface.

If this unit is used for hay and pasture, the main limitation is the high water table. The present vegetation in most areas is mainly grass, various clovers, juncus, and sedges. Under a good management system, this soil can produce yields of 2 tons per acre of improved meadow hay or 6 animal-unit-months per acre of pasture. Irrigation water must be carefully applied to avoid raising the water table. Shallow-rooted, water-tolerant plants are suited to this soil.

This soil is in capability subclass IIIw, irrigated.

443—Jubilee loamy sand. This very deep, poorly drained soil is on alluvial fans and terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,700 to 5,400 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, the surface layer is very dark brown loamy sand about 12 inches thick. Below this is a buried surface layer of mottled, very dark gray and olive fine sandy loam about 18 inches thick. The underlying material to a depth of 60 inches is olive gray, stratified fine sandy loam through coarse sand.

Included in this unit are Ophir soils on lower lying flood plains and Jubilee Variant soils on the lower parts of the unit. The unit is about 8 percent Ophir soils and 7 percent Jubilee Variant soils.

Permeability of this Jubilee soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 18 to 30 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 20 to 30 inches in winter and spring. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development, crops, pasture, and hayland.

Flooding is a severe limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The susceptibility of this soil to frost heaving is the main limitation to use of this unit as sites for construction of roads. Roads should be provided with drainage and an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the high water table. Under good management, including a conservation cropping system, this soil can produce yields of 3.5 tons per acre of alfalfa hay or 42 bushels per acre of barley. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients.

If this unit is used for hay and pasture, the main limitation is the high water table. Shallow-rooted, water-tolerant plants are suited to this soil. The present vegetation in most areas is mainly grasses, sedges, clovers, and juncus. Under a good management system, this soil can produce yields of 3.5 tons per acre of alfalfa, 3 tons per acre of improved meadow hay, or 8 animal-unit-months per acre of pasture. Irrigation water must be carefully applied to avoid raising the water table.

This soil is in capability subclass IIIw, irrigated.

445—Jubilee sandy loam, drained. This very deep soil is on alluvial fans and flood plains. The drainage has been altered. The soil formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,700 to 5,400 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, the surface layer is dark gray sandy loam about 22 inches thick. The underlying material to a depth of 60 inches is dark grayish brown, stratified, mottled loamy coarse sand and fine sandy loam.

Included in this unit are Voltaire soils in swales, Truckee soils on lower flood plains, and Vamp soils on low terrace remnants. The unit is about 5 percent Voltaire soils, 5 percent Truckee soils, and 5 percent Vamp soils.

Permeability of this Jubilee soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil

blowing is slight. A seasonal high water table is at a depth of 48 to 72 inches in winter and early spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding is a severe limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The flooding and the high water table are moderate limitations to use of this unit as septic tank absorption fields. Absorption fields should be designed to avoid raising the existing water table and polluting the water supplies. Dikes and channels that have outlets to bypass floodwater can be used to protect buildings and onsite sewage disposal systems from flooding.

Flooding and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Drainage should be provided.

If this unit is used for pasture, the main limitation is wetness. The present vegetation is mainly sedges, clovers, juncus, and grasses. Under a good management system, this soil can produce yields of 4.5 tons per acre of alfalfa, 3.5 tons per acre of improved meadow hay, or 9 animal-unit-months per acre of pasture. Irrigation water must be carefully applied to avoid raising the water table. Water-tolerant plants are suited to this soil.

This soil is in capability subclass IIIw, irrigated.

450—Voltaire loam. This very deep, poorly drained and very poorly drained soil is on alluvial fans and flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 7 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is gray loam about 20 inches thick. The underlying material to a depth of 60 inches is gray, mottled, stratified silty clay loam through loamy sand.

Included in this unit are Fettic soils on slightly higher terraces, Jubilee Variant soils near shallow stream channels, and Truckee soils on slightly higher parts of the flood plain. The unit is about 5 percent Fettic soils, 5 percent Jubilee Variant soils, and 5 percent Truckee soils.

Permeability of this Voltaire soil is slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 0 to 18 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 0 to 18 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development, pasture, and hayland. It can be used for irrigated crops if water is available.

Flooding and the high water table are limitations to use of this unit as sites for dwellings. Lowering the water table through drainage improves suitability for use as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this unit as septic tank absorption fields are the high water table and the slowly permeable underlying material. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to use of this soil as sites for roads are the low load-bearing strength, high water table, and susceptibility of this soil to frost heaving. Suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be provided with drainage.

If this unit is used for hay and pasture, the main limitation is the high water table. The present vegetation in most areas is grass. Under a good management system, yields of 2 tons per acre of improved meadow hay or 6 animal-unit-months per acre of pasture can be expected. Irrigation water must be carefully applied to avoid raising the water table. Shallow-rooted, water-tolerant plants are suited to this soil.

This soil is in capability subclasses IVw, irrigated, and VIw, nonirrigated.

451—Voltaire loam, slightly saline. This very deep, poorly drained and very poorly drained soil is on alluvial fans and flood plains. It formed in alluvium derived dominantly from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 7 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is black loam about 15 inches thick. The underlying material to a depth of 60 inches is dark grayish brown, mottled, stratified silty clay loam through loamy sand.

Included in this unit are Fettic soils on slightly higher terraces, Jubilee Variant soils near shallow stream channels, and Truckee soils on slightly higher parts of flood plains. The unit is about 5 percent Fettic soils, 5 percent Jubilee Variant soils, and 5 percent Truckee soils.

Permeability of this Voltaire soil is slow. Available water capacity is high. Effective rooting depth is 60

inches for water-tolerant plants but is limited to 0 to 18 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 0 to 18 inches in late winter and early spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. The soil is slightly affected by sodium salt.

This unit is used for urban development, pasture, and hayland. It can be used for irrigated crops if water is available.

Flooding and the high water table are severe limitations to use of this unit as sites for dwellings. Lowering the water table through drainage improves suitability for use as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this unit as septic tank absorption fields are the high water table and the slowly permeable underlying material. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, high water table, and susceptibility of this soil to frost heaving. Suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be provided with drainage.

If this unit is used for hay and pasture, the main limitations are the high water table and concentrations of salt and alkali. The present vegetation in most areas is mainly grass. Under a good management system, this soil can produce yields of 1.5 tons per acre of improved meadow hay or 5 animal-unit-months per acre of pasture. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for hay and pasture. Shallow-rooted, water-tolerant plants are suited to this soil. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations and to improve forage production. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali.

This soil is in capability subclasses IVw, irrigated, and VIw, nonirrigated.

452—Voltaire loam, strongly saline. This very deep, poorly drained and very poorly drained soil is on alluvial fans and flood plains. It formed in alluvium derived dominantly from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 7 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is black loam about 18 inches thick. The underlying material to a depth of 60 inches is stratified, dark grayish brown silty clay loam through loamy sand.

Included in this unit are Fettic soils on slightly higher terraces, Jubilee Variant soils near shallow stream channels, and Truckee soils on slightly higher parts of flood plains. The unit is about 5 percent Fettic soils, 5 percent Jubilee Variant soils, and 5 percent Truckee soils.

Permeability of this Voltaire soil is slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to depths of 0 to 18 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 0 to 18 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. The soil is strongly affected by sodium salt.

This unit is used for urban development and as rangeland.

Flooding and the high water table are limitations to use of this unit as sites for dwellings. Lowering the water table through drainage improves suitability for use as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this unit as septic tank absorption fields are the high water table and the slowly permeable underlying material. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to the use of this unit as sites for roads are the low load-bearing strength, high water table, and susceptibility of this soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly black greasewood and saltgrass. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of salinity and alkalinity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is in capability subclass VIIw, nonirrigated.

454—Voltaire silty clay, drained. This very deep, poorly drained and very poorly drained soil is on flood plains. Drainage has been altered. The soil formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,400 to 4,500 feet. The average annual precipitation is about 7 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is gray, mottled silty clay about 20 inches thick. The underlying material to a depth of 60 inches is gray, mottled silty clay loam with thin strata of silt loam to loamy sand.

Included in this unit are Fettic soils on slightly higher terraces, Jubilee Variant soils near shallow stream channels, and Truckee soils on slightly higher parts of the flood plains. The unit is about 5 percent Fettic soils, 5 percent Jubilee Variant soils, and 5 percent Truckee soils.

Permeability of this Voltaire soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 60 to 72 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitation to use of this unit as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

The main limitation to use of this unit as sites for roads is low load-bearing strength. Suitable material should be added to strengthen the base.

455—Voltaire-Truckee complex, drained. This map unit is on flood plains. Elevation is 4,400 to 5,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

This unit is 45 percent Voltaire silty clay, 0 to 2 percent slopes, and 40 percent Truckee silt loam, 0 to 2 percent slopes. The Voltaire soil occurs in the swales and on the lower part of the flood plain, and the Truckee soil occurs on the slightly higher part of the flood plain. Areas of these soils are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Fettic soils on slightly higher terraces and Jubilee Variant soils near shallow stream channels. The unit is about 8 percent Fettic soils and 7 percent Jubilee Variant soils.

The Voltaire soil is a very deep soil, and the drainage has been altered. The soil formed in alluvium derived dominantly from mixed rock. Slopes are 0 to 2 percent. Typically, the surface layer is gray, mottled silty clay about 20 inches thick. The underlying material to a depth of 60 inches is gray, mottled silty clay loam.

Permeability of the Voltaire soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 60 to 72 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

The Truckee soil is very deep, and the drainage has been altered to well drained. The soil formed in alluvium derived dominantly from mixed rock. Slopes are 0 to 2 percent. Typically, the surface layer is grayish brown silt loam about 12 inches thick. The underlying material to a depth of 60 inches is light brown stratified sandy loam through silty clay loam.

Permeability of the Truckee soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 72 to 84 inches in winter through summer. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. The soil is slightly affected by sodium salt.

This unit is used for urban development.

Flooding is a limitation to use of this unit as sites for dwellings. These soils are subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this unit as septic tank absorption fields are the slow permeability of the Voltaire soil and the moderately slow permeability of the Truckee soil. The limitations can be overcome by increasing the size of the absorption field.

The main limitation to use of this unit as sites for roads are the low load-bearing strength of the Voltaire soil and the susceptibility to frost heaving of the Truckee soil. Roads should be provided with drainage, and suitable material should be added to strengthen the base.

456—Voltaire clay loam, gravelly substratum. This very deep, poorly drained soil is on flood plains. Drainage has been altered. This soil formed in alluvium derived from mixed rock. Slopes are 0 to 2 percent. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 7 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is dark gray clay loam about 9 inches thick. The upper part of the underlying

material to a depth of 36 inches is gray, mottled, stratified clay to silt loam. Below a depth of 36 inches is stratified very gravelly coarse sand through sandy clay loam.

Included in this unit are Fettic soils on low terraces, Jubilee Variant soils on alluvial fans, and Truckee soils on slightly higher parts of the flood plains and fans. The unit is about 5 percent Fettic soils, 5 percent Jubilee Variant soils, and 5 percent Truckee soils.

Permeability of this Voltaire soil is slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 40 to 72 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. Some areas are slightly affected by salts and alkali.

This unit is used for urban development.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this unit as septic tank absorption fields are the high water table and the slowly permeable underlying material. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and susceptibility of this soil to frost heaving. Suitable material should be added to strengthen the base. Drainage is needed.

460—Surprise loamy sand, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from mixed rock sources. Elevation is 4,700 to 5,600 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is about 100 to 110 days.

Typically, the surface layer is grayish brown loamy sand about 14 inches thick. The subsoil is light yellowish brown gravelly sandy loam about 23 inches thick. The substratum to a depth of 66 inches or more is brown, stratified sandy loam to gravelly loamy sand.

Included in this unit are Greenbrae soils on toe slopes of alluvial fans, Indian Creek soils on older and higher terrace remnants, Incy soils on sand dunes, and Holbrook soils that are in drainageways and are flooded for short periods in most years. The unit is about 5 percent Greenbrae soils, 5 percent Indian Creek soils, 3 percent Incy soils, and 2 percent Holbrook soils.

Permeability of this Surprise soil is moderately rapid. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings and to use as septic tank absorption fields. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain.

Flooding and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Drainage should be provided.

The present vegetation in most areas of this soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by the moderately low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIIs, irrigated, and VIs, nonirrigated.

461—Surprise coarse sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,700 to 5,600 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is about 100 to 110 days.

Typically, the surface layer is grayish brown coarse sandy loam about 7 inches thick. The subsoil is light yellowish brown gravelly sandy loam about 17 inches thick. The substratum to a depth of 66 inches or more is brown, stratified sandy loam to gravelly loamy sand.

Included in this unit are Holbrook soils near drainageways, Indian Creek soils on older and higher terrace remnants, Incy soils on sand dunes, and Holbrook soils that are in drainageways and are flooded for short periods in most years. The unit is about 5 percent Holbrook soils near drainageways, 5 percent Indian Creek soils, 3 percent Incy soils, and 2 percent Holbrook soils in drainageways.

Permeability of this Surprise soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this soil as sites for dwellings and as septic tank absorption fields. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain.

Flooding and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by the moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIIe, irrigated, and VIs, nonirrigated.

470—Dalzell loamy fine sand. This moderately deep, somewhat poorly drained soil is on low lake terraces. It formed in alluvium derived dominantly from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,000 to 5,100 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray loamy fine sand about 14 inches thick. The subsoil is pale brown sandy clay loam about 18 inches thick. The upper 4 inches of the substratum is a strongly silica-cemented hardpan. The lower part to a depth of 60 inches is stratified loamy sand, gravelly coarse sand, and sandy loam. Depth to the strongly silica-cemented hardpan ranges from 20 to 40 inches.

Included in this unit are Godecke soils on remnant lake terraces, Incy soils on sand dunes, Surprise soils on toe slopes of alluvial fans, and Playas. This unit is about 5 percent Godecke soils, 5 percent Incy soils, 3 percent Surprise soils, and 2 percent Playas.

Permeability of this Dalzell soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 40 to 60 inches in late winter and spring. This soil is slightly to moderately affected by sodium salts.

This unit is used for urban development and as rangeland and pasture. It can be used for irrigated crops if water is available.

If this unit is used for urban development, this soil is well suited to use as sites for dwellings. The main limitations to use of this unit as septic tank absorption fields are the hardpan and the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the soil is drained, percolation can be improved in some areas by placing the leach line below the hardpan; however, care must be taken to avoid contamination of ground water.

The susceptibility of this soil to frost heaving is a moderate limitation to use of the unit as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, black greasewood, and saltgrass. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor. Salinity and alkalinity are the main limitations to seeding. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

If this unit is used for unimproved pasture, the main limitations are concentrations of salts and alkali and the high water table. An area-wide drainage project would be beneficial if this unit is used for improved pasture.

This soil is in capability subclasses IVw, irrigated, and VIIw, nonirrigated.

480—Holbrook gravelly loamy sand, 2 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,400 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 25 to 35 percent of the surface is covered with gravel. The surface layer is brown gravelly loamy sand about 8 inches thick. The subsoil is pale brown gravelly sandy loam about 6 inches thick. The substratum to a depth of 60 inches is stratified very gravelly fine sandy loam through gravelly sand.

Included in this unit are Surprise soils on lower slopes of alluvial fans; Springmeyer soils on higher terrace remnants; and Holbrook soils, which occur in stream channels and are flooded for short periods in most years. The unit is about 5 percent Surprise soils, 5 percent Springmeyer soils, and 5 percent Holbrook soils.

Permeability of this Holbrook soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flooding is also the main limitation to use of this unit as septic tank absorption fields. Flash floods

can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain.

Flooding and susceptibility to frost heaving are moderate limitations to use of this soil as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because the available water capacity of the surface layer is very low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclasses IVe, irrigated, and VIIs, nonirrigated.

482—Holbrook cobbly loamy sand, 2 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,400 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 25 to 35 percent of the surface is covered with cobbles. The surface layer is brown cobbly loamy sand about 10 inches thick. The underlying material to a depth of 60 inches is stratified stony sand through very gravelly loam.

Included in this unit are Surprise soils on lower slopes of alluvial fans; Springmeyer soils on higher terrace remnants; and Holbrook soils, which occur in channels and are flooded for short periods in most years. The unit is about 5 percent Surprise soils, 5 percent Springmeyer soils, and 5 percent Holbrook soils.

Permeability of this Holbrook soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this soil as sites for dwellings. Flooding is also the main limitation to use of this unit as septic tank absorption fields. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain.

Flooding and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

490—Graufels bouldery sand, 8 to 15 percent slopes. This moderately deep, somewhat excessively drained soil is on uplands. It formed in residuum derived dominantly from granitic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 120 days.

Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery sand about 10 inches thick. The underlying material to a depth of 22 inches is light yellowish brown gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 22 inches. Depth to weathered granitic bedrock ranges from 20 to 40 inches.

Included in this unit are Mottsville soils on colluvial slopes and short alluvial fans, Luppino soils on pediment remnants, and Rock outcrop that occurs as isolated peaks. The unit is about 6 percent Mottsville soils, 6 percent Luppino soils, and 3 percent Rock outcrop.

Permeability of this Graufels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

Steepness of slope is a moderate limitation to use of this unit as sites for dwellings. The main limitation to use of this unit as septic tank absorption fields is the restricted depth of this soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

Steepness of slope is a moderate limitation to use of this unit as sites for roads. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and cheatgrass. The production of forage is limited by the restricted depth of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more

desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

491—Graufels-Rock outcrop complex, 15 to 30 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 120 days.

This unit is 75 percent Graufels bouldery sand, 15 to 30 percent slopes, and 15 percent Rock outcrop. The Graufels soil is on side slopes of uplands, and the Rock outcrop is on ridges and peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Mottsville soils on colluvial slopes and short alluvial fans, Luppino soils on pediment remnants, and Linhart soils along narrow bottoms of drainageways. The unit is about 4 percent Mottsville soils, 4 percent Luppino soils, and 2 percent Linhart soils.

The Graufels soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery sand about 10 inches thick. The underlying material to a depth of 22 inches is light yellowish brown gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 22 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Graufels soils is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rocks as small peaks or ridges.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the restricted depth of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this unit as sites for roads is the steepness of slope. Roads should be built in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and antelope bitterbrush. The production of forage is limited by the restricted depth of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

The soil in this unit is in capability subclass VIIs, nonirrigated.

492—Graufels bouldery sand, 15 to 30 percent slopes. This moderately deep, somewhat excessively drained soil is on uplands. It formed in residuum derived dominantly from granitic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 120 days.

Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery sand about 12 inches thick. The underlying material to a depth of 26 inches is light yellowish brown gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 26 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Included in this unit are Mottsville soils on colluvial slopes and short alluvial fans; Acrelane soils on smooth, slightly concave slopes; Linhart soils along narrow bottoms of drainageways; and Rock outcrop that occurs as isolated peaks. The unit is about 5 percent Mottsville soils, 5 percent Acrelane soils, 3 percent Linhart soils, and 2 percent Rock outcrop.

Permeability of this Graufels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the restricted depth of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the restricted depth of the root zone over bedrock and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

493—Graufels-Glenbrook complex, 8 to 50 percent slopes. This map unit is on uplands. Elevation is 4,700 to 6,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 120 days.

This unit is 60 percent Graufels gravelly loamy coarse sand, 15 to 50 percent slopes, and 25 percent Glenbrook cobbly sand, 8 to 30 percent slopes. The Graufels soil is on side slopes of uplands. The Glenbrook soil is on tops of uplands along dikes. The areas of these soils are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Tanob soils at higher elevations on smooth slopes and shallow depressions, Haypress soils near high ridges and peaks, Koontz soils on metavolcanic ridges, and Rock outcrop that occurs as isolated peaks. The unit is about 4 percent Tanob soils, 3 percent Haypress soils, 3 percent Koontz soils, and 5 percent Rock outcrop.

The Graufels soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is dark grayish brown gravelly loamy coarse sand about 11 inches thick. The underlying material to a depth of 25 inches is light yellowish brown gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 20 inches. Depth to weathered granitic bedrock ranges from 25 to 40 inches.

Permeability of the Graufels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Glenbrook soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, 15 to 25 percent of the surface is covered with cobbles. The surface layer is grayish brown cobbly sand about 7 inches thick. The underlying material to a depth of 13 inches is light brownish gray gravelly loamy coarse sand. Weathered bedrock is at a depth of 13 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Glenbrook soil is rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for construction of dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the restricted depth of the soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation is most areas is mainly big sagebrush, Anderson peachbrush, and antelope bitterbrush. The production of forage is limited by the restricted depth of the root zone over bedrock and the very low available water capcity. The suitability of this soil for rangeland seeding is very poor, mainly because of steepness of slope, the very low available water capacity of the surface layer, and the restricted depth of the root zone over bedrock. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The soils are in capability subclass VIIe, nonirrigated.

494—Graufels gravelly loamy coarse sand, 4 to 8 percent slopes. This moderately deep, somewhat excessively drained soil is on uplands. It formed in residuum dominantly of granitic rocks. Elevation is 4,500 to 6,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 120 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is dark grayish brown gravelly loamy coarse sand about 9 inches thick. The underlying material to a depth of 24 inches is light yellowish brown gravelly loamy coarse sand. Weathered

granitic bedrock is at a depth of 24 inches. Depth to weathered granitic bedrock ranges from 20 to 40 inches.

Included in this unit are Mottsville soils on colluvial slopes and short alluvial fans, Luppino soils on pediment remnants, Linhart soils along narrow bottoms of drainageways, and Rock outcrop that occurs as isolated peaks. The unit is about 6 percent Mottsville soils, 4 percent Luppino soils, 3 percent Linhart soils, and 2 percent Rock outcrop.

Permeability of this Graufels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

This soil is well suited to use as sites for dwellings. The main limitation to use of this unit as septic tank absorption fields is the restricted depth to bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

Roads can easily be constructed and maintained on this soil.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the restricted depth of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

495—Graufels-Glenbrook-Rock outcrop complex, 4 to 15 percent slopes. This map unit is on uplands. Elevation is 4,700 to 6,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 120 days.

This unit is 60 percent Graufels gravelly loamy coarse sand, 4 to 8 percent slopes; 20 percent Glenbrook cobbly sand, 8 to 15 percent slopes; and 10 percent Rock outcrop. The Graufels soil is on smooth tops of uplands. The Glenbrook soil is on intrusive dikes of uplands, and Rock outcrop is on ridges and peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Luppino soils on pediments and Mottsville soils on colluvial slopes and short alluvial fans. The unit is about 5 percent Luppino soils and 5 percent Mottsville soils.

The Graufels soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is dark grayish brown gravelly loamy coarse sand about 9 inches thick. The underlying material to a depth of 23 inches is light yellowish brown gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 23 inches. Depth to weathered granitic bedrock ranges from 20 to 40 inches.

Permeability of the Graufels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Glenbrook soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 15 to 25 percent of the surface is covered with cobbles. The surface layer is grayish brown cobbly sand about 7 inches thick. The underlying material to a depth of 13 inches is light brownish gray gravelly loamy coarse sand. Weathered bedrock is at a depth of 13 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Glenbrook soil is rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

Rock outcrop consists mainly of apatite dikes.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the steepness of slope and shallowness over bedrock of the Glenbrook soil are moderate limitations to use as sites for dwellings. Heavy equipment is needed to cut into the bedrock. The main limitation to use of this unit as septic tank absorption fields is restricted depth to bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The steepness of slope and shallowness over bedrock of the Glenbrook soil are moderate limitations to use of this unit as sites for roads. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Heavy equipment is needed to cut into the bedrock.

The present vegetation in most areas is mainly big sagebrush, green ephedra, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the restricted depth of the root zone over bedrock and

the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

These soils are in capability subclass VIIs, nonirrigated.

496—Graufels-Glenbrook-Haypress association. This map unit is on uplands. Elevation is 6,000 to 7,000 feet. The average annual precipitation is about 10 to 16 inches, the average annual air temperature is 45 to 49 degrees F, and the average frost-free period is 60 to 100 days.

This unit is 35 percent Graufels gravelly loamy coarse sand, 30 to 50 percent slopes; 30 percent Glenbrook cobbly sand, 30 to 70 percent slopes; and 20 percent Haypress very bouldery loamy coarse sand, 30 to 70 percent slopes. The Graufels soil is on south-facing slopes of uplands. The Glenbrook soil is on ridges and on eroded south-facing slopes. The Haypress soil is on north-facing slopes of uplands and on higher elevations.

Included in this unit are Mottsville soils on colluvial slopes and short alluvial fans, Luppino soils on gently to strongly sloping pediment remnants, and Rock outcrop that occurs as isolated peaks. The unit is about 5 percent Mottsville soils, 5 percent Luppino soils, and 5 percent Rock outcrop.

The Graufels soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is dark grayish brown gravelly loamy coarse sand about 15 inches thick. The underlying material to a depth of 26 inches is light yellowish brown gravelly loamy coarse sand. Weathered granitic bedrock is at a depth of 26 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Graufels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Glenbrook soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 15 to 20 percent of the surface is covered with cobbles. The surface layer is grayish brown cobbly sand about 12 inches thick. The underlying material to a depth of 18 inches is light brownish gray gravelly loamy coarse sand. Weathered bedrock is at a depth of 18 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Glenbrook soil is rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Haypress soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 5 to 10 percent of the surface is covered with stones and boulders. The surface layer is very bouldery loamy coarse sand about 15 inches thick. The underlying material to a depth of 46 inches is gravelly coarse sand or gravelly loamy coarse sand. Weathered bedrock is at a depth of 46 inches. Depth to bedrock ranges from 40 to 60 inches.

Permeability of the Haypress soil is rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Graufels soil is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the very low available water capacity and restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and the steepness of slope.

The present vegetation in most areas of the Glenbrook soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity of the surface layer, steepness of slope, and the shallowness of the root zone over bedrock.

The present vegetation in most areas of the Haypress soil is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the very low available water capacity, the short growing season, and the cold temperature in spring. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and the steepness of slope.

Cold soil temperatures delay plant growth and readiness for grazing. Grazing should be delayed until the soils are warm and the plants have achieved sufficient growth. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. To ensure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This Graufels soil is in capability subclass VIIe, nonirrigated. The Glenbrook and Haypress soils are in capability subclass VIIs, nonirrigated.

500—Mottsville sand, 0 to 4 percent slopes. This very deep, excessively drained soil is on alluvial fans. It formed in alluvium derived mainly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is grayish brown sand about 10 inches thick. The underlying material to a depth of 60 inches is light brownish gray stratified gravelly coarse sand to loamy sand.

Included in this unit are Linhart soils on inset alluvial fans and next to drainageways, Bedell soils on remnants between drainageways, and Spasprey soils on lower terrace remnants adjacent to toe slopes of alluvial fans. Also included in an area near Washoe Lake is a sandy soil that has a seasonal high water table at a depth of 3 to 5 feet during late winter and spring. This unit is about 5 percent Linhart soils, 5 percent Bedell soils, and 5 percent Spasprey soils.

Permeability of this Mottsville soil is rapid to very rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash-flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this soil as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. Rapid permeability is a limitation to use of this unit as septic tank absorption fields. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Flooding is a moderate limitation to use of this soil as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. The duration and intensity of grazing should be adjusted to season of growth and to precipitation. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVs, irrigated and VIIs, nonirrigated.

504—Mottsville sand, 8 to 15 percent slopes. This very deep, excessively drained soil is on alluvial fans. It formed in alluvium mainly derived from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is grayish brown sand about 10 inches thick. The underlying material to a depth of 60 inches is light brownish gray stratified gravelly coarse sand to loamy sand.

Included in this unit are Linhart soils on inset alluvial fans and next to drainageways, Bedell soils on remnants between drainageways, and Spasprey soils on lower terrace remnants adjacent to toe slopes of alluvial fans. This unit is about 5 percent Linhart soils, 5 percent Bedell soils, and 5 percent Spasprey soils.

Permeability of this Mottsville soil is rapid to very rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash-flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to construction of dwellings on areas of this unit. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is rapid permeability. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Steepness of slope and flooding are moderate limitations to use of this soil as sites for roads. Roads should be provided with drainage. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. The duration and intensity of grazing should be adjusted to season of growth and precipitation. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVs, irrigated and VIIs, nonirrigated.

505—Mottsville gravelly coarse sand, 4 to 8 percent slopes. This very deep, excessively drained soil is on alluvial fans. It formed in alluvium derived mainly from granitic rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 10 to 12 inches,

the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is grayish brown gravelly coarse sand about 11 inches thick. The underlying material to a depth of 60 inches is light brownish gray stratified gravelly coarse sand to loamy sand.

Included in this unit are Linhart soils on inset alluvial fans and next to drainageways, Bedell soils on remnants between drainageways, and Spasprey soils on lower terrace remnants adjacent to toe slopes of alluvial fans. The unit is about 5 percent Linhart soils, 5 percent Bedell soils, and 5 percent Spasprey soils.

Permeability of this Mottsville soil is rapid to very rapid. Available water capacity is low. Effective rooting depth is 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

This soil is well suited to use as sites for the construction of dwellings. Rapid permeability is a limitation to use of this unit as septic tank absorption fields. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Roads can easily be constructed and maintained on this soil.

The present vegetation in most areas of this soil is mainly big sagebrush, Anderson peachbrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by moderately low precipitation and low available water capacity. This soil is rated as poorly suited to rangeland seeding, mainly because of the very low available water capacity of the surface layer. The duration and intensity of grazing should be adjusted to season of growth and to precipitation. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVs, irrigated and VIIs, nonirrigated.

510—Settlemeyer fine sandy loam, 0 to 2 percent slopes. This very deep, poorly drained soil is on flood plains and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,700 to 5,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 43 to 45 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is dark gray or black fine sandy loam about 15 inches thick. The upper 24 inches of the underlying material is grayish brown silty clay loam. The lower part to a depth of 60 inches is greenish gray, stratified very gravelly loamy fine sand and fine sandy loam.

Included in this unit are Dressler soils on higher parts of alluvial fans and terraces, Voltaire soils on flood plains and in shallow depressions, and Holbrook soils near upper parts of drainageways. The unit is about 5 percent Dressler soils, 5 percent Voltaire soils, and 5 percent Holbrook soils.

Permeability of this Settlemeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 24 to 36 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The seasonal high water table is at a depth of 20 to 40 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. It is slightly saline and alkali-affected.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

The high water table and flooding are limitations to use of this unit as sites for dwellings. Lowering the water table through drainage improves suitability for use as sites for dwellings. This soil is subject to seasonal flooding that can only be controlled by major flood-control structures. The main limitations to use of this unit as septic tank absorption fields are the high water table and moderately slow permeability. The absorption field should be designed to avoid raising the water table and polluting the water supplies. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and the susceptibility of this soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to strengthen the base.

The present vegetation in most areas is mainly grass. Under a good management system, this soil will produce yields of 1 ton per acre of improved meadow hay or 3 animal-unit-months per acre of pasture. If this unit is used for hay and pasture, the main limitations are the high water table and the content of salts and alkali. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for hay and pasture. Shallow-rooted, water-tolerant plants are suited to this soil. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali.

This soil is in capability subclasses IIIw, irrigated and VIw, nonirrigated.

513—Settlemeyer-Notus complex. This map unit is on flood plains. Elevation is 4,500 to 5,000 feet. The

average annual precipitation is about 8 to 12 inches, the average annual air temperature is 45 to 49 degrees F, and the average frost-free period is 90 to 110 days.

This unit is 45 percent Settlemeyer fine sandy loam, 0 to 2 percent slopes, and 40 percent Notus stony loamy fine sand, 0 to 2 percent slopes. The Settlemeyer soil is on flood plains, and the Notus soil is on flood plains near the channels. Areas of these soils are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Dressler soils on lower parts of alluvial fans, Voltaire soils in swales on flood plains, Holbrook soils near the upper part of drainageways, and Oest soils on higher parts of alluvial fans. The unit is about 4 percent Dressler soils, 4 percent Voltaire soils, 4 percent Holbrook soils, and 3 percent Oest soils.

The Settlemeyer soil is very deep and poorly drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is dark gray or black fine sandy loam about 15 inches thick. The upper 24 inches of the underlying material is grayish brown silty clay loam. The lower part to a depth of 60 inches is greenish gray, stratified gravelly loamy fine sand and fine sandy loam.

Permeability of the Settlemeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 24 to 36 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 20 to 40 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. This soil is slightly saline and alkali-affected.

The Notus soil is very deep and moderately well drained. It formed in alluvium derived from mixed rock sources. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is light brownish gray stony loamy fine sand about 12 inches thick. The underlying material to a depth of 60 inches is light brownish gray and light yellowish brown stratified very gravelly coarse sand through sandy loam.

Permeability of the Notus soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 48 to 60 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 48 to 60 inches in late winter and spring. This soil is subject to occasional flooding for brief periods during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and pasture.

The main limitations to use of this unit as sites for dwellings are flooding and the high water table. This soil is subject to seasonal flooding that can only be controlled by major flood control structures. These structures are difficult to establish and maintain. Lowering the water table through drainage improves suitability for use as sites for dwellings.

The main limitations to use of this unit as septic tank absorption fields are the high water table, moderately slow permeability, and flooding. Absorption fields should be designed to avoid raising the existing water table and polluting water supplies. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, susceptibility of the soil to frost heaving, and flooding. Roads should be provided with drainage. Suitable material should be added to strengthen the base.

The present vegetation in most areas is mainly grass. Under a good management system, these soils will produce yields of 3 animal-unit-months of pasture. If this unit is used for hay and pasture, the main limitations are the high water table and the content of salts and alkali. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for hay and pasture. Shallow-rooted, water-tolerant plants are suited to these soils. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alakali.

These soils are in capability subclasses IIIw, irrigated and VIw, nonirrigated.

514—Settlemeyer gravelly loam, 2 to 4 percent slopes. This very deep, poorly drained soil is on flood plains and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,700 to 5,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 43 to 45 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is dark gray gravelly loam about 12 inches thick. The upper 23 inches of the underlying material is grayish brown silty clay loam. The lower part to a depth of 60 inches is greenish gray, stratified gravelly loamy sand and loam.

Included in this unit are Dressler soils on lower parts of alluvial fans, Voltaire soils in swales on low flood plains, Notus soils near lower drainageways, and Holbrook soils near upper parts of drainageways and on alluvial fans. The unit is about 4 percent Dressler soils, 4 percent Voltaire soils, 4 percent Notus soils, and 3 percent Holbrook soils.

Permeability of this Settlemeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 12 to 36 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 12 to 30 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. The soil is slightly saline and alkali-affected.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding and the high water table are limitations to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can only be controlled by major flood control structures. Lowering the water table through drainage improves the suitability of the soil as sites for dwellings.

The main limitations to use of this unit as septic tank absorption fields are the high water table and moderately slow permeability. Absorption fields should be designed to avoid raising the existing water table and polluting the water supplies. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and the susceptibility of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide a stable base.

The present vegetation is mainly grass and sedges. Under a good management system, this soil will produce yields of 1 ton per acre of improved meadow hay or 3 animal unit months per acre of pasture. If this unit is used for hay and pasture, the main limitations are the high water table and the content of salts and alkali. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for hay and pasture. Shallow-rooted, water-tolerant plants are suited to this soil. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations and to improve forage production. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali.

This soil is in capability subclasses IIIw, irrigated and VIw, nonirrigated.

520—Dressler loamy sand, 2 to 4 percent slopes. This very deep, somewhat poorly drained soil is on alluvial fans and flood plains. It formed in alluvium derived dominantly from mixed rock sources. Elevation is 4,700 to 5,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is grayish brown loamy sand about 19 inches thick. The underlying material to a depth of 60 inches is pale brown gravelly fine sandy loam and gravelly loamy sand.

Included in this unit are Settlemeyer soils on lower parts of flood plains, Notus soils along drainageways, and wet areas that occur as seeps. The unit is about 6 percent Settlemeyer soils, 5 percent Notus soils, and 4 percent wet areas that occur as seeps.

Permeability of this Dressler soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 30 to 40 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 30 to 40 inches late in winter and early in spring. This soil is subject to flooding during storms of prolonged high intensity.

This unit is used for urban development, crops, pasture, and hayland.

Flooding is a limitation to use of this soil as sites for dwellings. This soil is subject to seasonal flooding during prolonged storms of high intensity. Structures for protection from flooding are difficult to establish and maintain. The main limitation to use of the soil as septic tank absorption fields is the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to the use of the soil as sites for roads is the susceptibility of the soil to frost heaving. Suitable base material and an adequate wearing surface are needed. Drainage should be provided.

The present vegetation in most areas is mainly grass. If this unit is used for pasture, the main limitation is the high water table. Under a good pasture or hayland management system, yields of 3 tons per acre of alfalfa, or 7.5 animal-unit-months per acre of pasture can be expected. Irrigation water must be carefully applied to avoid raising the water table. Shallow-rooted, water-tolerant plants are suited to this soil.

If this unit is used for irrigated crops, the main limitation is the high water table. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid overirrigating and leaching plant nutrients.

This soil is in capability subclasses IIIw, irrigated and VIIw, nonirrigated.

530—Sagouspe sand. This very deep, somewhat poorly drained soil is on flood plains and low terraces. It formed in sandy alluvium derived dominantly from mixed rock sources. Slopes are 0 to 2 percent. Elevation is

4,400 to 4,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is dark grayish brown sand about 21 inches thick. The underlying material to a depth of 60 inches is stratified, dark grayish brown and brown coarse sand and silt loam.

Included in this unit are Ophir soils on lower parts of alluvial fans, Cradlebaugh soils in swales and old slough bottoms, and Vamp soils on low terrace remnants. The unit is 5 percent Ophir soils, 5 percent Cradlebaugh soils, and 5 percent Vamp soils.

Permeability of this Sagouspe soil is rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 36 to 60 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. A seasonal high water table is at a depth of 36 to 40 inches in late winter and spring. This soil is subject to brief periods of flash flooding during storms of unusually high intensity.

This unit is used for urban development and pasture.

Flooding is a limitation to use of the soil as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of the soil as septic tank absorption fields are the high water table and the rapid permeability. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid this pollution hazard. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

Flooding and susceptibility to frost heaving are moderate limitations to the use of the soil as a site for roads. Suitable base material and an adequate wearing surface are needed. Drainage should be provided.

The present vegetation in most areas is grass. If this unit is used for pasture, the main limitation is the high water table. Under a good pasture management system, yields of 5 animal-unit-months per acre of pasture can be expected. Irrigation water must be carefully applied to avoid raising the water table.

This soil is in capability subclasses IVw, irrigated and VIIw, nonirrigated.

531—Sagouspe fine sandy loam. This very deep, somewhat poorly drained soil is on flood plains and low terraces. It formed in sandy alluvium dominantly from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,400 to 4,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is dark grayish brown fine sandy loam about 21 inches thick. The underlying material to a depth of 60 inches is stratified dark grayish brown and brown coarse sand and silt loam.

Included in this map unit are Ophir soils on lower parts of alluvial fans, Cradlebaugh soils on swales and old slough bottoms, and Vamp soils on low terrace remnants. The unit is about 5 percent Ophir soils, 5 percent Cradlebaugh soils, and 5 percent Vamp soils.

Permeability of this Sagouspe soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 36 to 60 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 36 to 40 inches in late winter and spring. This soil is subject to brief periods of flash flooding during storms of unusually high intensity. It is slightly saline and alkali-affected.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this soil as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitations to use of the soil as septic tank absorption fields are a high water table and the rapid permeability. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

Flooding and susceptibility to frost heaving are moderate limitations to the use of the soil as sites for roads. An adequate wearing surface is needed. Drainage should be provided.

The present vegetation in most areas of this soil is mainly grass. Under a good management system, this soil will produce yields of 6 animal-unit-months per acre of pasture. Shallow-rooted, water-tolerant plants are suited to this soil. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for hay and pasture. The high water table limits the leaching of salts from the surface layer. Lowering the water table through artificial drainage helps reduce salt and alkali concentrations and to improve forage production. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid

raising the water table and increasing the concentration of salts and alkali in the surface layer.

This soil is in capability subclasses IIIw, irrigated and VIw, nonirrigated.

532—Sagouspe gravelly sand, gravelly substratum. This very deep, somewhat poorly drained soil is on flood plains. It formed in sandy alluvium derived dominantly from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,400 to 4,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is dark grayish brown gravelly sand about 10 inches thick. The upper 30 inches of the underlying material is stratified, dark grayish brown coarse sand and silt loam. The lower part to a depth of 60 inches is dark grayish brown very gravelly loamy coarse sand.

Included in this unit are Dithod soils, which are strongly affected by salts and alkali and occur on alluvial fans; Riverwash along the channel near drainageways; and Truckee soils on lower terraces. The unit is about 5 percent Dithod soils, 5 percent Riverwash, and 5 percent Truckee soils. The percentage varies from one area to another.

Permeability of this Sagouspe soil is rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 36 to 60 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 30 to 40 inches in late winter and spring. This soil is subject to occasional flooding in late winter and spring.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

Flooding is a severe limitation to use of this soil as sites for dwellings. This soil is subject to seasonal flooding that can only be controlled by major flood control structures. The main limitations to use of the soil as septic tank absorption fields are flooding, the high water table, and the rapidly permeable underlying material. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. Dikes and channels that have outlets to bypass floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

Flooding is the main limitation to the use of this soil as a site for roads. Drainage should be provided.

The present vegetation in most areas is grass. If this unit is used for pasture, the main limitation is the high water table. Under a good pasture management system, yields of 5 animal-unit-months per acre of pasture can be expected. Irrigation water must be carefully applied to avoid raising the water table. Shallow-rooted, water-tolerant plants are suited to this soil.

This soil is in capability subclasses IVw, irrigated and VIIw, nonirrigated.

550—Leviathan stony sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on terraces. It formed in fluvial sediments and alluvium from mixed rock sources. Elevation is 4,800 to 6,000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown stony loam about 9 inches thick. The subsoil to a depth of 60 inches is brown very gravelly sandy clay loam.

Included in this map unit are Springmeyer soils on lower terraces, Oest soils on higher alluvial fans, Verdico soils on remnants of lower terraces, and Washoe soils near drainageways. The unit is 5 percent Springmeyer soils, 5 percent Oest soils, 3 percent Verdico soils, and 2 percent Washoe soils.

Permeability of this Leviathan soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If the unit is used for urban development, high clay content is a moderate limitation for dwellings. High clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. The main limitation to use of the soil as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

High clay content and susceptibility to frost heaving are moderate limitations to the use of the soil as a site for roads. An adequate wearing surface is needed. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, Anderson peachbrush, and cheatgrass. The production of forage is limited by moderately low precipitation and the moderate available water capacity of the soil. The soil is rated as poorly suited to rangeland seeding because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more

desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVs, irrigated and VIIs, nonirrigated.

551—Leviathan stony sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on terraces. It formed in fluvial sediments and alluvium from mixed rock sources. Elevation is 4,800 to 6,000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown stony sandy loam about 9 inches thick. The subsoil to a depth of 60 inches is brown very gravelly sandy clay loam.

Included in this map unit are Springmeyer soils on lower terraces, Oest soils on alluvial fan skirts, Reno soils on higher pediment remnants, and Washoe soils near drainageways. The unit is about 5 percent Springmeyer soils, 5 percent Oest soils, 3 percent Reno soils, and 2 percent Washoe soils.

Permeability of this Leviathan soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and rangeland.

If this unit is used for urban development, high clay content is a moderate limitation for dwellings. High clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. The main limitation to use of the soil as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to the use of the soil as a site for roads. An adequate wearing surface is needed. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, Anderson peachbrush, and cheatgrass. The production of forage is limited by moderately low precipitation and the moderate available water capacity of the soil. The soil is rated as poorly suited to rangeland seeding because of the low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

553—Leviathan stony sandy loam, 15 to 30 percent slopes. This very deep, well drained soil is on side slopes of terraces. It formed in alluvium from mixed rock sources. Elevation is 4,800 to 6,000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown stony sandy loam about 9 inches thick. The subsoil to a depth of 60 inches is brown very gravelly sandy clay loam.

Included in this map unit are Oest soils on alluvial fan skirts, Reno soils on higher pediment remnants, and Stodick soils on steeper side slopes of pediments. The unit is about 5 percent Oest soils, 5 percent Reno soils, and 5 percent Stodick soils.

Permeability of this Leviathan soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation for dwellings is the steepness of slope. The main limitation to use of the soil as septic tank absorption fields is the moderately slowly permeable subsoil and the steepness of slope. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. The absorption field should be designed to prevent surfacing of the leachate downslope.

The main limitation to use of the unit as sites for roads is steepness of slope. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, Anderson peachbrush, and bottlebrush squirreltail. The production of forage is limited by moderately low precipitation and the moderate available water capacity of the soil. The soil is rated as poorly suited to rangeland seeding because of the low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush encourages the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

554—Leviathan very stony sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on terraces. It formed in fluvial sediments and alluvium from mixed rock sources. Elevation is 4,800 to 6,000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown very stony sandy loam about 11 inches thick. The subsoil to a

depth of 60 inches is brown very gravelly sandy clay loam.

Included in this unit are Reno soils on higher terrace remnants, Waspo soils on uplands over bedrock, and Chalco soils on higher pediment remnants. The unit is about 5 percent Reno soils, 5 percent Waspo soils, and 5 percent Chalco soils.

Permeability of this Leviathan soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, high clay content is a moderate limitation for dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. The main limitation to use of the soil as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to the use of the soil as a site for roads. An adequate wearing surface is needed. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by moderately low precipitation and the moderate available water capacity of the soil. The rating is poor for rangeland seeding because of the low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

557—Leviathan very stony sandy loam, 30 to 50 percent slopes. This very deep, well drained soil is on side slopes of terraces. It formed in fluvial sediments and alluvium from mixed rock sources. Elevation is 4,800 to 6,000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown very stony sandy loam about 11 inches thick. The subsoil to a depth of 60 inches is brown very gravelly sandy clay loam.

Included in this unit are Reno soils on higher terrace remnants, Waspo soils on uplands over bedrock, and Chalco soils on higher pediment remnants. The unit is about 5 percent Reno soils, 5 percent Waspo soils, and 5 percent Chalco soils.

Permeability of this Leviathan soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation for the construction of dwellings is the steepness of slope. The main limitations for use of the soil as septic tank absorption fields are the moderately slowly permeable subsoil and the steepness of slope. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. The absorption field should be designed to prevent surfacing of the leachate downslope.

The main limitation to use of the unit as sites for roads is steepness of slope. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, Anderson peachbrush, and cheatgrass. The production of forage is limited by moderately low precipitation and the moderate available water capacity of the soil. The soil is rated as poorly suited for rangeland seeding because of steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

559—Leviathan extremely stony sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on terraces. It formed in alluvium from mixed rock sources. Elevation is 4,800 to 6,000 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown extremely stony sandy loam about 11 inches thick. The subsoil to a depth of 60 inches is brown very gravelly sandy clay loam.

Included in this map unit are Oest soils on higher alluvial fan skirts, Indian Creek soils on pediment remnants, and Holbrook soils near drainageways. The unit is about 5 percent Oest soils, 5 percent Indian Creek soils, and 5 percent Holbrook soils.

Permeability of this Leviathan soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the

hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, high clay content is a moderate limitation for dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. The main limitation to use of the soil as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to the use of the soil as sites for roads. An adequate wearing surface is needed. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by moderately low precipitation and moderate available water capacity. The soil is rated as poorly suited to rangeland seeding, mainly because of large stones on the surface. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush encourages the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

570—Turria loam. This very deep, well drained soil is on alluvial fans. It formed in alluvium from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 5,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is light brownish gray loam about 2 inches thick. The subsoil is brown clay loam 10 inches thick. The substratum to a depth of 60 inches is pale brown, stratified sandy loam and silt loam.

Included in this map unit are Jowec soils on terrace remnants, Aladshi soils on higher alluvial fan skirts, and Mellor soils on lower terrace remnants adjacent to drainageways. The unit is about 5 percent Jowec soils, 5 percent Aladshi soils, and 5 percent Mellor soils.

Permeability of this Turria soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to shallow flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to the use of the soil as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitations for use of the soil as septic tank absorption fields are flooding and the moderately slowly permeable subsoil. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. Structures for protection of this soil from flash floods are difficult to establish and maintain.

The main limitations to the use of the soil as sites for roads are low strength, susceptibility to frost heaving, and flooding. Suitable base material and an adequate wearing surface are needed. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and Indian ricegrass. The production of forage is limited by low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIc, irrigated and VIc, nonirrigated.

585—Barnard-Trosi association. This map unit is on dissected alluvial fans and on terraces. Elevation is 4,600 to 5,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 80 to 100 days.

This unit is 50 percent Barnard stony sandy loam, 2 to 4 percent slopes, and 35 percent Trosi very stony sandy loam, 4 to 8 percent slopes. Barnard and Trosi soils are on similar landscape positions. The Barnard soil has a hardpan at a depth of 20 to 30 inches and supports big sagebrush. The Trosi soil has a hardpan at a depth of 12 to 20 inches and supports low sagebrush.

Included in this map unit are Bieber soil on lower terraces, Galeppi soils adjacent to drainageways on the side slopes, Indian Creek soils on nearly level alluvial fan tops, Oest soils on alluvial fan skirts, and wet areas near seeps. The unit is about 4 percent Bieber soils, 4 percent Galeppi soils, 3 percent Indian Creek soils, 2 percent Oest soils, and 2 percent wet areas.

The Barnard soil is moderately deep and well drained. It formed in alluvium and pedisediments from mixed rock sources. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 15 inches thick. The subsoil is light yellowish brown clay about 11 inches thick. The upper part of the substratum is an indurated, silica-cemented hardpan. The depth to the hardpan ranges

from 20 to 30 inches. Below the hardpan is gravelly and cobbly alluvium.

Permeability of the Barnard soil is slow. Available water capacity is low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Trosi soil is shallow and well drained. It formed in alluvium from mixed rock sources. Typically, 3 to 15 percent of the surface is covered with stones and some cobbles. The surface layer is light brown very stony sandy loam about 12 inches thick. The subsoil is brown very cobbly clay about 7 inches thick. The upper 15 inches of the substratum is an indurated hardpan. The depth to the hardpan ranges from 12 to 20 inches. Below the hardpan is very gravelly and very cobbly alluvium interbedded with layers of finer material.

Permeability of the Trosi soil is very slow. Available water capacity is very low. Effective rooting depth is 12 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The unit is used for urban development and as rangeland.

If the unit is used for urban development, the main limitations to the use of the unit as sites for buildings are the high shrink-swell potential of the Barnard soil and stoniness and the hardpan. Structural damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. Heavy equipment is needed to excavate the large stones and to cut through the hardpan. The main limitations to use of this unit as septic tank absorption fields are the hardpan and the very slowly permeable subsoil of the Trosi soil and the hardpan of the Barnard soil. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitations to use of this unit as sites for roads are low strength of the soil and high clay content of the Barnard soil and the hardpan of the Trosi soil. Suitable base material and an adequate wearing surface are needed. Deep cuts should be avoided because of the underlying hardpan.

The present vegetation in most areas of the Barnard soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout the area. The production of forage is limited by moderately low precipitation, low available water capacity, and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is poor, mainly because of the moderately low precipitation.

The present vegetation on the Trosi soils in most areas is mainly low sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by very low available water capacity and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity of the surface layer and the restricted depth of the root zone over the hardpan.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The Barnard soil is in capability subclass VIs, nonirrigated. The Trosi soil is in capability subclass VIIs, nonirrigated.

590—Springmeyer stony loam, 0 to 2 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is grayish brown stony loam about 13 inches thick. The subsoil is brown gravelly sandy clay loam about 27 inches thick. The substratum to a depth of 60 inches is stratified very gravelly sandy clay loam to loamy sand.

Included in this map unit are Orr soils on lower terraces, Leviathan soils on higher terrace remnants, Holbrook soils near drainageways, and wet soils near seeps. The unit is about 5 percent Orr soils, 5 percent Leviathan soils, 3 percent Holbrook soils, and 2 percent wet soils.

Permeability of this Springmeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development, crops, pasture, and hayland.

If the unit is used for urban development, high clay content is a moderate limitation for dwellings. High clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. The main limitation to use of the soil as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to the use of this soil as a site for roads. Suitable base material and an adequate wearing surface are needed. Drainage should be provided.

The present vegetation in most areas is mainly grasses. If this unit is used for hay and pasture, the main limitation is stones. Under a good pasture management system, yields of 6 animal-unit-months per acre of pasture can be expected.

This soil is in capability subclasses IVs, irrigated and VIs, nonirrigated.

591—Springmeyer stony loam, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is grayish brown stony loam about 13 inches thick. The subsoil is brown gravelly sandy clay loam about 27 inches thick. The substratum to a depth of 60 inches is stratified very gravelly sandy clay loam and loamy sand.

Included in this map unit are Orr soils on lower terraces, Leviathan soils on higher terrace remnants, Holbrook soils near drainageways, and wet soils near seeps. The unit is about 5 percent Orr soils, 5 percent Leviathan soils, 3 percent Holbrook soils, and 2 percent wet areas.

Permeability of this Springmeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development, pasture, and hayland.

If the unit is used for urban development, high clay content is a moderate limitation for dwellings. High clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. The main limitation to use of the soil as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to the use of the soil as sites for roads. An adequate wearing surface is needed. Drainage should be provided.

If this unit is used for hay and pasture, the main limitations are stones and slope. The present vegetation in most areas is mainly grasses. Under a good pasture management system, yields of 6 animal-unit-months per acre of pasture can be expected.

This soil is in capability subclasses IVs, irrigated and VIs, nonirrigated.

595—Springmeyer sandy clay loam, 0 to 2 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is brown sandy clay loam about 13 inches thick. The subsoil is pale brown gravelly sandy clay loam about 27 inches thick. The substratum to a depth of 60 inches is stratified very gravelly sandy clay loam to loamy sand.

Included in this map unit are Oest soils on higher alluvial fans, Holbrook soils near drainageways, and wet areas near seeps. The unit is about 4 percent Oest soils, 4 percent Holbrook soils, and 2 percent wet areas.

Permeability of this Springmeyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

If the unit is used for urban development, high clay content is a moderate limitation for dwellings. High clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. The main limitation to use of the soil as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to the use of the soil as a site for roads. An adequate wearing surface is needed. Drainage should be provided.

If this unit is used for hay and pasture, the main limitation is the length of the growing season. Under a good management system, yields of 6 animal-unit-months per acre of pasture can be expected.

This soil is in capability subclass IIc, irrigated and VIc, nonirrigated.

600—Idlewild clay loam, drained. This very deep, somewhat poorly drained soil is on alluvial fans and terraces. The drainage has been altered. This soil formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,300 to 4,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is very dark grayish brown clay loam about 13 inches thick. The subsoil is olive brown silty clay and silty clay loam about 23 inches thick. The substratum is olive brown stratified sandy clay loam and silty clay loam about 26 inches thick.

Included in this unit are Fleischmann soils on slightly higher terrace remnants, Orr soils on alluvial fan skirts, and Truckee soils on lower flood plains and in swales.

The unit is about 5 percent Fleischmann soils, 5 percent Orr soils, and 5 percent Truckee soils.

Permeability of this Idlewild soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitation to construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

The main limitations to use of this soil as sites for roads are low load-bearing strength, high clay content, and susceptibility of this soil to frost heaving. Suitable material should be added to provide a stable base and an adequate wearing surface. Drainage should be provided.

This soil is in capability subclass, IIw, irrigated and VIw, nonirrigated.

601—Idlewild sandy loam, drained. This very deep soil is on alluvial fans and terraces. The drainage has been altered. This soil formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,300 to 4,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is very dark grayish brown sandy loam about 13 inches thick. The subsoil is olive brown silty clay about 23 inches thick. The substratum is olive brown, stratified sandy clay loam and silty clay loam 26 inches thick.

Included in this unit are Fleischmann soils on slightly higher terrace remnants, Orr soils on alluvial fan skirts, and Truckee soils on flood plains and in swales. The unit is about 5 percent Fleischmann soils, 5 percent Orr soils, and 5 percent Truckee soils.

Permeability of this Idlewild soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitation to construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. The limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

The main limitations to use of this unit as sites for roads are low load-bearing strength, high clay content, and susceptibility to frost heaving. Roads should be provided with a stable base, an adequate wearing surface, and drainage.

This soil is in capability subclass IIw, irrigated.

602—Idlewild gravelly sandy loam. This very deep, somewhat poorly drained soil is on low-lying terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,300 to 4,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is very dark grayish brown gravelly sandy loam about 10 inches thick. The subsoil is olive brown silty clay about 26 inches thick. The substratum to a depth of 60 inches or more is olive brown, stratified sandy clay loam and clay loam.

Included in this unit are Dressler soils on lower alluvial fans, Settlemeyer soils in bottoms of swales, Vamp soils on terrace remnants, and Fleischmann soils on higher terrace remnants. The unit is about 4 percent Dressler soils, 4 percent Settlemeyer soils, 4 percent Vamp soils, and 3 percent Fleischmann soils.

Permeability of this Idlewild soil is slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 30 to 60 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The seasonal high water table is at a depth of 30 to 60 inches. This soil is subject to flooding during storms of prolonged high intensity.

This unit is used for urban development and pasture and as hayland. It can be used for irrigated crops if water is available.

Flooding and high clay content are limitations to use of this unit as sites for dwellings. The high shrink-swell potential of this soil can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. Flash floods can occur on this soil during storms of high intensity. Structures for protection from such floods are difficult to establish and maintain.

The main limitations to use of this soil as septic tank absorption fields are the high water table and the slowly

permeable subsoil. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. The limitation imposed by slow permeability can be overcome by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to use of this unit as sites for roads are low load-bearing strength, high clay content, and the susceptibility of the soil to frost heaving. If roads are constructed across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface. Drainage should be provided.

If this unit is used for hay and pasture, the main limitation is the high water table. The vegetation is mainly grass. Shallow-rooted, water-tolerant plants are suited to this soil. Irrigation water must be carefully applied to avoid raising the water table.

This soil is in capability subclasses IIIw, irrigated and VIw, nonirrigated.

612—Verdico very stony sandy loam, 4 to 8 percent slopes. This moderately deep, well drained soil is on pediments and strath terraces. It formed in pedisediment and fluvial sediment. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown very stony sandy loam about 2 inches thick. The subsoil is light yellowish brown clay about 20 inches thick. The substratum is light yellowish brown gravelly clay. Weathered tuff is at a depth of 29 inches. Depth to weathered bedrock is 20 to 40 inches.

Included in this unit are Reno soils on higher terraces, Northmore soils on lower alluvial fans, and Galeppi soils near the ends of alluvial terraces. The unit is about 5 percent Reno soils, 5 percent Northmore soils, and 5 percent Galeppi soils.

Permeability of this Verdico soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this unit as septic tank absorption fields are restricted depth over bedrock and the very slowly permeable subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for construction of roads are low load-bearing strength and high clay content. If roads are constructed across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas of this soil is mainly low sagebrush and Douglas rabbitbrush. The production of forage is limited by moderately low precipitation, the restricted depth of the root zone over bedrock, high clay content, and low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

613—Verdico extremely stony sandy loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on pediments and strath terraces. It formed in pedisediment and fluvial sediment. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown extremely stony sandy loam about 2 inches thick. The subsoil is light yellowish brown clay about 20 inches thick. The substratum is light yellowish brown gravelly clay. Weathered tuff is at a depth of 29 inches. Depth to weathered bedrock is 20 to 40 inches.

Included in this unit are Reno soils on higher terraces, Northmore soils on lower alluvial fans, and Galeppi soils near the ends of terraces. The unit is about 5 percent Reno soils, 5 percent Northmore soils, and 5 percent Galeppi soils.

Permeability of this Verdico soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be

prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this soil as septic tank absorption fields are the restricted depth to bedrock and the very slowly permeable subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for construction of roads are low load-bearing strength and high clay content. If roads are constructed across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas of this soil is mainly low sagebrush and Douglas rabbitbrush. The production of forage is limited by moderately low precipitation, high clay content, the restricted depth of the root zone over bedrock, and the low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

614—Verdico extremely stony sandy loam, 15 to 30 percent slopes. This moderately deep, well drained soil is on pediments and strath terraces. It formed in pedisediment and fluvial sediment. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown extremely stony sandy loam about 2 inches thick. The subsoil is light yellowish brown clay about 20 inches thick. The substratum is light yellowish brown gravelly clay. Weathered tuff is at a depth of 29 inches. Depth to weathered bedrock is 20 to 40 inches.

Included in this unit are Reno soils on higher terrace remnants, Northmore soils on lower alluvial fans, and Galeppi soils near the ends of alluvial terraces. The unit is about 5 percent Reno soils, 5 percent Northmore soils, and 5 percent Galeppi soils.

Permeability of this Verdico soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for construction of dwellings are the steepness of slope and the high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this soil as septic tank absorption fields are the restricted depth to bedrock, the very slowly permeable subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this soil as sites for roads are low load-bearing strength, steepness of slope, and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas of this soil is mainly low sagebrush and Douglas rabbitbrush. The production of forage is limited by moderately low precipitation, high clay content, the restricted depth of the root zone over bedrock, and the low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

615—Verdico sandy loam, 4 to 8 percent slopes. This moderately deep, well drained soil is on pediments and strath terraces. It formed in pedisediment and fluvial sediment. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown sandy loam about 2 inches thick. The subsoil is light yellowish brown clay about 20 inches thick. The substratum is light yellowish brown gravelly clay. Weathered tuff is at a depth of 29 inches. Depth to weathered bedrock is 20 to 40 inches.

Included in this unit are Reno soils on higher terrace remnants, Northmore soils on lower alluvial fans, and Galeppi soils near the ends of terraces. The unit is about 5 percent Reno soils, 5 percent Northmore soils, and 5 percent Galeppi soils.

Permeability of this Verdico soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this soil as septic tank absorption fields are the restricted depth to bedrock and the very slowly permeable subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are low load-bearing strength and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas of this soil is mainly low sagebrush. The production of forage is limited by moderately low precipitation, high clay content, the restricted depth of the root zone over bedrock, and the low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

620—Orr stony sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,800 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 0.1 to 1 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 10 inches thick. The subsoil is light yellowish brown gravelly sandy clay loam about 40 inches thick. The substratum to a depth of 60 inches or more is very pale brown gravelly sandy loam.

Included in this unit are Oest soils on higher alluvial fan collars, Springmeyer soils on terrace remnants, Bedell soils on inset alluvial fans, and wet areas that occur on seeps. The unit is about 4 percent Oest soils, 4 percent Springmeyer soils, 4 percent Bedell soils, and 3 percent wet areas.

Permeability of this Orr soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland and pasture. It can be used for irrigated crops if water is available.

If this unit is used for urban development, high clay content is a moderate limitation to use as sites for construction of dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to use of this unit as sites for roads. Suitable material should be added to provide an adequate wearing surface. Drainage should be provided.

The present vegetation in most areas of this soil is mainly big sagebrush and grass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

If this unit is used for pasture, the main limitations are stones and slope. The present vegetation in most areas is mainly grasses. Under a good pasture management system, this soil will produce yields of 6 animal-unit-months per acre of pasture.

This soil is in capability subclasses IIIs, irrigated, and VIc, nonirrigated.

621—Orr stony sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,800 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 0.1 to 1 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 10 inches thick. The subsoil is light yellowish brown gravelly sandy clay loam about 40 inches thick.

The substratum to a depth of 60 inches or more is very pale brown gravelly sandy loam.

Included in this unit are Oest soils on higher alluvial fan collars, Springmeyer soils on terrace remnants, Bedell soils on inset alluvial fans, and wet areas that occur as seeps. The unit is about 4 percent Oest soils, 4 percent Springmeyer soils, 4 percent Bedell soils, and 3 percent wet areas. Also included west of Verdi is a soil that is similar to Orr soil but receives more precipitation and is moist for longer periods of time.

Permeability of this Orr soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, a moderate limitation to use as sites for construction of dwellings is high clay content, which results in moderately high shrink-swell potential. The moderately high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas of this soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. The production of forage is limited by moderately low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is moderately low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVs, irrigated and VIs, nonirrigated.

622—Orr stony sandy loam, gravelly substratum, 2 to 4 percent slopes. This very deep, well drained soil is on terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,800 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 12 inches thick. The subsoil is pale brown gravelly sandy clay loam about 38 inches thick. The substratum to a depth of 60 inches or more is stratified very gravelly sand, gravelly loamy sand, and gravelly sandy loam.

Included in this map unit are Oest soils on higher alluvial fan collars, Springmeyer soils on terrace remnants, Bedell soils on inset alluvial fans, and wet areas that occur as seeps. This unit is 4 percent Oest soils, 4 percent Springmeyer soils, 4 percent Bedell soils, and 3 percent wet areas. Also included west of Verdi is a small area of soils that are similar to Orr soils except that they receive more precipitation, are moist for longer periods of time, and support Jeffrey pine.

Permeability of this Orr soil is moderately slow in the subsoil and rapid in the substratum. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development, rangeland, and pasture.

If the unit is used for urban development, high clay content is a moderate limitation for the construction of dwellings. High clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented if foundations and footings are properly designed and the soil is kept dry by diverting water away from the buildings. The main limitations to use of the soil as septic tank absorption fields are the moderately slowly permeable subsoil and the rapidly prmeable substratum. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. Absorption fields should be designed so that the leach lines are not placed into the rapidly permeable layers. The leachate can move through the rapidly permeable material and into the ground water or into nearby surface water before it is sufficiently purified.

Susceptibility to frost heaving and high clay content are moderate limitations to the use of the soil as sites for roads. If roads are built across areas of this soil, suitable material should be added to provide an adequate wearing surface. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush encourages the growth of desirable forage grasses.

If this unit is used for hay and pasture, the main limitation is stones. The present vegetation is mainly

grass. Under a good management system, yields of 6 animal-unit-months per acre of pasture can be expected.

This soil is in capability subclasses IVs, irrigated and VIs, nonirrigated.

623—Orr sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on river terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,800 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is light yellowish brown gravelly sandy clay loam about 40 inches thick. The substratum to a depth of 60 inches or more is very pale brown gravelly sandy loam.

Included in this unit are Fleischmann soils on terrace remnants; Oest soils on higher alluvial fan collars; and Truckee soils, which are saline and alkali-affected and are on flood plains and in swales. The unit is about 5 percent Fleischmann soils, 5 percent Oest soils, and 5 percent Truckee soils.

Permeability of this Orr soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and irrigated crops.

If this unit is used for urban development, a moderate limitation to construction of dwellings is high clay content. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the length of the growing season. Under good management including a conservation cropping system, this soil will produce yields of 4.5 tons per acre of alfalfa, 46 bushels per acre of barley, or 60 bushels per acre of oats. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients.

This soil is in capability subclasses IIc, irrigated and VIc, nonirrigated.

624—Orr gravelly sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on river terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,800 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is brown gravelly sandy loam about 12 inches thick. The subsoil is light yellowish brown gravelly sandy clay loam about 38 inches thick. The substratum to a depth of 60 inches or more is very pale brown gravelly sandy loam.

Included in this unit are Fleischmann soils on terrace remnants; Oest soils on higher alluvial fan collars; and Truckee soils, which are saline and alkali-affected and are on flood plains and in swales. The unit is about 5 percent Fleischmann soils, 5 percent Oest soils, and 5 percent Truckee soils.

Permeability of this Orr soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used for urban development and irrigated crops.

If this unit is used for urban development, a moderate limitation to construction of dwellings is high clay content. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with an adequate wearing surface and drainage.

If this unit is used for irrigated crops, the main limitation is the length of the growing season. Under good management including a conservation cropping system, this soil will produce yields of 4.5 tons per acre of alfalfa, 46 bushels per acre of barley, or 60 bushels per acre of oats. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients.

This soil is in capability subclasses IIc, irrigated and VIc, nonirrigated.

630—Fleischmann gravelly clay loam, 2 to 4 percent slopes. This moderately deep, well drained soil is on terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,300 to 5,200 feet. The

average annual precipitation is about 8 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly clay loam about 4 inches thick. The upper 6 inches of the subsoil is brown heavy clay loam, and the lower 10 inches is yellowish brown clay. The upper 23 inches of the substratum is a hardpan. The lower part to a depth of 60 inches is variable, compact, stratified alluvial material. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are Orr soils on alluvial fans, Reno soils on higher terrace remnants, and Idlewild soils on lower terraces in swales. The unit is about 5 percent Orr soils, 5 percent Reno soils, and 5 percent Idlewild soils.

Permeability of this Fleischmann soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and pasture. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitations to use of this unit as sites for roads are low load-bearing strength and high clay content. If roads are built across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

If this unit is used for hay and pasture, the main limitations are the moderate depth of the root zone and the very low available water capacity. The present vegetation is mainly grass. Under a good pasture management system, this soil will produce yields of 5 animal-unit-months per acre of pasture. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop so that a perched water table is not created above the hardpan. A close-growing plant cover is needed to reduce the erosion hazard if steeper slopes are irrigated.

This soil is in capability subclasses IIIe, irrigated and VIIs, nonirrigated.

631—Fleischmann gravelly clay loam, 4 to 8 percent slopes. This moderately deep, well drained soil is on terraces. It formed in alluvium derived dominantly from mixed rock sources. Elevation is 4,300 to 5,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly clay loam about 4 inches thick. The upper 6 inches of the subsoil is brown heavy clay loam, and the lower 10 inches is yellowish brown clay. The upper 23 inches of the substratum is a hardpan. The lower part to a depth of 60 inches is variable, compact, stratified alluvial material. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are Orr soils on alluvial fans, Reno soils on terrace remnants, and Idlewild soils on low terraces in swales. The unit is about 5 percent Orr soils, 5 percent Reno soils, and 5 percent Idlewild soils.

Permeability of this Fleischmann soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and pasture.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitations to use of this unit as sites for roads are low load-bearing strength and high clay content. If roads are constructed across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

If this unit is used for pasture, the main limitations are the moderate depth of the root zone and the very low available water capacity. The present vegetation is mainly grass. Under a good pasture management system, this soil will produce yields of 4 animal-unit-months per acre of pasture. An irrigation water management system should be used that does not perch a water table on the hardpan. A close-growing plant cover is needed to reduce the erosion hazard if steeper slopes are irrigated.

This soil is in capability subclasses IVe, irrigated and VIIs, nonirrigated.

632—Fleischmann loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on terraces. It formed in alluvium derived dominantly from mixed rock sources. Elevation is 4,300 to 5,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown loam about 4 inches thick. The upper 6 inches of the subsoil is brown heavy clay loam, and the lower 10 inches is yellowish brown clay. The upper 23 inches of the substratum is a hardpan. The lower part to a depth of 60 inches is variable, compact, stratified alluvial material. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are Reywat soils on small upland remnants, Galeppi soils on alluvial fans, Orr soils on inset alluvial fans, and wet areas that occur as seeps. The unit is about 4 percent Reywat soils, 4 percent Galeppi soils, 4 percent Orr soils, and 3 percent wet areas.

Permeability of this Fleischmann soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitations to use of this unit as sites for roads are low load-bearing strength and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface.

This soil is not assigned a capability classification.

640—Notus stony loamy fine sand. This very deep soil is on alluvial flood plains. Drainage has been altered. This soil formed in alluvium from mixed rock sources. Slopes are 0 to 4 percent. Elevation is 4,300 to 4,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is about 110 days.

Typically, about 1 percent of the surface is covered with stones. The surface layer is light brownish gray stony loamy fine sand about 12 inches thick. The underlying material to a depth of 60 inches is stratified extremely gravelly coarse sand to sandy loam.

Included in this unit are Rose Creek soils on lower flood plains, Holbrook soils near the upper parts of drainageways, and Settlemeyer soils on lower parts of alluvial fans near wet seeps. The unit is about 5 percent Rose Creek soils, 5 percent Holbrook soils, and 5 percent Settlemeyer soils.

Permeability of this Notus soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 48 to 60 inches in late winter and spring. This soil is subject to occasional flooding during storms of prolonged high intensity in late winter and spring. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for construction of dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. Flooding is a limitation to use of the soil as septic tank absorption fields.

Flooding is a limitation to use of this unit as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, rubber rabbitbrush, and grass. The production of forage is limited by the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is in capability subclass VIIs, nonirrigated.

650—Chalco very stony clay loam, 15 to 30 percent slopes. This shallow, well drained soil is on side slopes of pediment remnants. It formed in residuum derived dominantly from lacustrine sedimentary rock. Elevation is 4,900 to 5,400 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light brownish gray very stony clay loam about 3 inches thick. The subsoil is dark yellowish brown clay about 12 inches thick. Weathered lacustrine sedimentary rock is at a depth of 15 inches. Depth to weathered sedimentary rock ranges from 10 to 20 inches.

Included in this unit are Stodick soils on convex slopes, Reno soils on higher pediment remnants, and Badland on eroded areas. The unit is about 5 percent Stodick soils, 5 percent Reno soils, and 5 percent Badland.

Permeability of this Chalco soil is very slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for construction of dwellings are the steepness of slope and high clay content. The

high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this soil as septic tank absorption fields are the restricted depth to bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Designs that increase the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are low load-bearing strength, steepness of slope, and high clay content. If roads are constructed across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the restricted depth of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor because of the restricted depth of the root zone over bedrock and the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

651—Chalco very stony clay loam, 30 to 50 percent slopes. This shallow, well drained soil is on slopes of pediment remnants. It formed in residuum derived dominantly from lacustrine sedimentary rock. Elevation is 4,900 to 5,400 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light brownish gray very stony clay loam about 4 inches thick. The subsoil is dark yellowish brown clay about 11 inches thick. Weathered lacustrine sedimentary rock is at a depth of 15 inches. Depth to weathered sedimentary rock ranges from 10 to 20 inches.

Included in this unit are Badland on eroded areas and Stodick soils on higher convex slopes. The unit is about 8 percent Badland and 7 percent Stodick soils.

Permeability of this Chalco soil is very slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for construction of dwellings are the steepness of slope and the high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this unit as septic tank absorption fields are the restricted depth to bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Designs that increase the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are low load-bearing strength, steepness of slope, and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. The production of forage is limited by the restricted depth of the root zone over bedrock and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope, the very low available water capacity, and the restricted depth of the root zone over bedrock. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

652—Chalco stony loam, 4 to 8 percent slopes. This shallow, well drained soil is on pediment remnants. It formed in residuum derived dominantly from lacustrine sedimentary rock. Elevation is 4,900 to 5,400 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is light brownish gray stony loam 3 inches thick. The subsoil is dark yellowish brown clay about 12 inches thick. Weathered lacustrine sedimentary rock is at a depth of 15 inches. Depth to

weathered sedimentary rock ranges from 10 to 20 inches.

Included in this unit are Reno soils on the pediment remnants, Badland on eroded areas, Waspo soils in areas of localized alluvium, and Galeppi soils on the back slopes of the pediments. The unit is about 5 percent Reno soils, 5 percent Badland, 3 percent Waspo soils, and 2 percent Galeppi soils.

Permeability of this Chalco soil is very slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the high clay content of this soil. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitation to use of this unit as septic tank absorption fields is the shallowness of this soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize this limitation. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are low load-bearing strength and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the shallowness of the root zone over bedrock and the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

653—Chalco cobbly sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on pediment remnants. It formed in residuum derived dominantly from lacustrine sedimentary rock. Elevation is 4,900 to 5,400 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 15 to 25 percent of the surface is covered with cobbles. The surface layer is light brownish gray cobbly sandy loam about 3 inches thick. The subsoil is dark yellowish brown clay about 12 inches thick. Weathered lacustrine sedimentary rock is at a depth of 15 inches. Depth to weathered sedimentary rock ranges from 10 to 20 inches.

Included in this unit are Reno soils on the pediment remnants, Badland on eroded areas, Waspo soils in areas of localized alluvium, and Galeppi soils on the back slopes of the pediments. The unit is about 5 percent Reno soils, 5 percent Badland, 3 percent Waspo soils, and 2 percent Galeppi soils.

Permeability of this Chalco soil is very slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is the high clay content. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitation to use of this unit as septic tank absorption fields is the shallowness of this soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize this limitation. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. If roads are constructed across areas of this soil, suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the shallowness of the root zone over bedrock and the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

654—Chalco-Celeton Variant complex, 2 to 8 percent slopes. This map unit is on terraces and pediment remnants. Elevation is 4,900 to 5,400 feet. The

average annual precipitation is about 8 to 10 inches, the average annual air temperature is 47 to 49 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 45 percent Chalco cobbly sandy loam, 4 to 8 percent slopes, and 40 percent Celeton Variant very gravelly loam, 2 to 8 percent slopes. The Chalco soil is on top of pediment remnants. The Celeton Variant is on terraces. Areas of these soils are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Badland on eroded areas, Aquinas soils on higher alluvial fans and terraces, and Wedertz soils on inset alluvial fans. The unit is about 6 percent Badland, 5 percent Aquinas soils, and 4 percent Wedertz soils.

The Chalco soil is shallow and well drained. It formed in residuum derived dominantly from lacustrine sedimentary rock. Typically, 15 to 25 percent of the surface is covered with cobbles. The surface layer is light brownish gray cobbly sandy loam about 3 inches thick. The subsoil is dark yellowish brown clay about 12 inches thick. Weathered lacustrine sedimentary rock is at a depth of 15 inches. Depth to weathered sedimentary rock ranges from 10 to 20 inches.

Permeability of the Chalco soil is very slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Celeton Variant soil is very shallow and somewhat excessively drained. It formed in residuum derived dominantly from lacustrine sedimentary rock. Typically, 40 to 50 percent of the surface is covered with gravel. The surface layer is light gray very gravelly loam about 6 inches deep over highly weathered lacustrine sedimentary rock. Depth to weathered sedimentary rock ranges from 5 to 15 inches.

Permeability of the Celeton Variant soil is rapid. Available water capacity is very low. Effective rooting depth is 5 to 15 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for construction of dwellings are the high clay content of the Chalco soil and the shallowness over bedrock of the Celeton Variant soil. High clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. Heavy equipment is needed to cut into the bedrock.

The main limitation to use as septic tank absorption fields is shallowness over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this Chalco soil as sites for roads are low load-bearing strength and high clay content. Susceptibility to frost heaving and depth to bedrock are moderate limitations on the Celeton Variant soil. Suitable material should be added to provide a stable base and an adequate wearing surface. Drainage should be provided. Deep cuts should be avoided because of the underlying bedrock.

The present vegetation in most areas is mainly Douglas rabbitbrush, spiny hopsage, and bottlebrush squirreltail. The production of forage is limited by the shallowness of the root zone over bedrock and very low available water capacity. The suitability of these soils for rangeland seeding is very poor, mainly because of the shallowness of the root zone over bedrock and the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

These soils are in capability subclass VIIs, nonirrigated.

660—Oest very bouldery sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 3 to 10 percent of the surface is covered with boulders. The surface layer is grayish brown very bouldery sandy loam about 13 inches thick. The subsoil is brown very gravelly sandy loam about 31 inches thick. The substratum is pale brown very gravelly loamy sand that extends to 60 inches.

Included in this unit are Leviathan soils on alluvial fan remnants, Orr soils on lower terraces, Apmat soils in an area west of Verdi and at higher elevations, and Notus soils near drainageways. The unit is about 5 percent Leviathan soils, 5 percent Orr soils, 3 percent Apmat soils, and 2 percent Notus soils.

Permeability of this Oest soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, a moderate limitation to use as sites for construction of dwellings is

stones. Heavy equipment is needed to excavate the large stones. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Susceptibility to frost heaving and stones are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the large stones on the surface. Grazing should be delayed until the soil is firm and the more desirable plants have sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

661—Oest bouldery sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, about 1 percent of the surface is covered with boulders. The surface layer is grayish brown bouldery sandy loam about 14 inches thick. The subsoil is brown very gravelly sandy loam about 26 inches thick. The substratum is pale brown very gravelly loamy sand that extends to 60 inches.

Included in this unit are Leviathan soils on alluvial fan remnants, Orr soils on lower terraces, Apmat soils west and southwest of Verdi and at higher elevations, and Notus soils near drainageways. The unit is about 5 percent Leviathan soils, 5 percent Orr soils, 3 percent Apmat soils, and 2 percent Notus soils.

Permeability of this Oest soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated pasture if water is available.

If this unit is used for urban development, a moderate limitation to use as sites for construction of dwellings is stones. Heavy equipment is needed to excavate the large stones. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

The susceptibility of this soil to frost heaving and stones are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the moderately low precipitation and the large stones on the surface. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVs, irrigated, and VIIs, nonirrigated.

662—Oest extremely stony sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 50 percent of the surface is covered with stones. The surface layer is grayish brown extremely stony sandy loam about 8 inches thick. The subsoil is brown very gravelly sandy loam about 32 inches thick. The substratum is pale brown very gravelly loamy sand that extends to 60 inches.

Included in this unit are Leviathan soils on alluvial fan remnants, Orr soils on lower terraces, Apmat soils at higher elevations, and Notus soils near drainageways. The unit is about 5 percent Leviathan soils, 5 percent Orr soils, 3 percent Apmat soils, and 2 percent Notus soils.

Permeability of this Oest soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, a moderate limitation to use as sites for dwellings is stones. Heavy equipment is needed to excavate the large stones. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

The susceptibility of this soil to frost heaving and stones are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage and an adequate wearing surface.

The present vegetation in most areas of this soil is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the large stones on the surface. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

663—Oest very gravelly loam, 15 to 30 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 35 to 60 percent of the surface is covered with gravel. The surface layer is grayish brown very gravelly loam about 15 inches thick. The subsoil is brown very gravelly sandy loam about 25 inches thick. The substratum is pale brown very gravelly loamy sand that extends to 60 inches.

Included in this unit are Leviathan soils on the lower part of alluvial fans, Orr soils on lower terraces, Settlemeyer soils near seeps, and Notus soils near drainageways. The unit is about 5 percent Leviathan soils, 5 percent Orr soils, 3 percent Settlemeyer soils, and 2 percent Notus soils.

Permeability of this Oest soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the rapidly permeable substratum and the steepness of slope. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. Care should be taken to prevent surfacing of the leachate downslope.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is poor because of steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

664—Oest very gravelly loam, 8 to 15 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is grayish brown very gravelly loam about 14 inches thick. The subsoil is brown very gravelly sandy loam about 26 inches thick. The substratum is pale brown very gravelly loamy sand that extends to 60 inches.

Included in this unit are Leviathan soils on the lower part of alluvial fans, Orr soils on lower terraces, Apmat soils at higher elevations, and Notus soils near drainageways. The unit is about 5 percent Leviathan soils, 5 percent Orr soils, 3 percent Apmat soils, and 2 percent Notus soils.

Permeability of this Oest soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, a moderate limitation to use as sites for construction of dwellings is the steepness of slope. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Steepness of slope and susceptibility to frost heaving are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage and an adequate wearing surface. They should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas of this soil is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation. The suitability of this soil for

rangeland seeding is fair. The main limitation for seeding is moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

668—Oest very bouldery sandy loam, 30 to 50 percent slopes. This very deep, well drained soil is on side slopes of alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 3 to 15 percent of the surface is covered with boulders. The surface layer is grayish brown very bouldery sandy loam about 15 inches thick. The subsoil is brown very gravelly sandy loam about 25 inches thick. The substratum is pale brown very gravelly loamy sand that extends to 60 inches.

Included in this unit are Leviathan soils on the lower part of alluvial fans, Orr soils on lower terraces, Apmat soils west and southwest of Verdi and at higher elevations, and Notus soils near drainageways. The unit is about 5 percent Leviathan soils, 5 percent Orr soils, 3 percent Apmat soils, and 2 percent Notus soils.

Permeability of this Oest soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the rapidly permeable substratum and the steepness of slope. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. Care should be taken to prevent surfacing of the leachate downslope.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

669—Oest gravelly sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly sandy loam about 14 inches thick. The subsoil is brown very gravelly sandy loam about 26 inches thick. The substratum is pale brown very gravelly loamy sand that extends to 60 inches.

Included in this unit are Leviathan soils on alluvial fan remnants, Orr soils on lower terraces, and Holbrook soils near drainageways. The unit is about 5 percent Leviathan soils, 5 percent Orr soils, and 5 percent Holbrook soils.

Permeability of this Oest soil is moderate in the subsoil and rapid in the substratum. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, this soil is well suited to use as sites for dwellings. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

The susceptibility of this soil to frost heaving is a moderate limitation to use of this unit as sites for roads. Roads should be provided with drainage and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation. The suitability of this soil for rangeland seeding is fair. The main limitation for seeding is the moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated.

670—Galeppi sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on dissected alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is brown sandy clay loam about 12 inches thick. The substratum is weakly silica-cemented sandy loam to a depth of 60 inches.

Included in this unit are Oest soils on higher alluvial fan skirts, Barnard soils on tops of higher terrace remnants, Stodick soils on small upland remnants, and Reno soils in shallow depressions. Also included west of Verdi is a small area of soil that is similar to Galeppi soil but receives more precipitation and is moist for longer periods of time. The unit is about 5 percent Oest soils, 5 percent Barnard soils, 3 percent Stodick soils, and 2 percent Reno soils.

Permeability of this Galeppi soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is about 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the high clay content is a moderate limitation to use as sites for construction of dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

Susceptibility to frost heaving and high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIIe, irrigated, and VIs, nonirrigated.

671—Galeppi sandy loam, 8 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is brown sandy clay loam about 14 inches thick. The substratum is weakly silica-cemented sandy loam to a depth of 60 inches.

Included in this unit are Oest soils on higher alluvial fan skirts, Barnard soils on tops of higher terrace remnants, Stodick soils on small upland remnants, and Reno soils in shallow depressions on remnants. The unit is about 5 percent Oest soils, 5 percent Barnard soils, 3 percent Stodick soils, and 2 percent Reno soils.

Permeability of this Galeppi soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is about 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the high clay content and the steepness of slope are moderate limitations to use as sites for construction of dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

Steepness of slope, susceptibility to frost heaving, and high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVe, irrigated, and VIs, nonirrigated.

673—Galeppi sandy loam, 15 to 30 percent slopes. This very deep, well drained soil is on dissected alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is brown sandy loam about 10 inches thick. The subsoil is brown sandy clay loam about 11 inches thick. The substratum is weakly silica-cemented sandy loam to a depth of 60 inches.

Included in this unit are Oest soils on higher alluvial fan skirts, Barnard soils on higher terrace remnants, Stodick soils on small upland remnants, and Verdico soils in shallow depressions. The unit is about 5 percent Oest soils, 5 percent Barnard soils, 3 percent Stodick soils, and 2 percent Verdico soils.

Permeability of the Galeppi soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is about 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the steepness of slope. The moderately high shrink-swell potential of this soil can cause structural damage. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitations to use of this unit as septic tank absorption fields are the moderately slowly permeable subsoil and the steepness of slope. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer. Absorption fields should be designed to prevent surfacing of the leachate downslope.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because the available water capacity of the surface layer is very low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIe, nonirrigated.

674—Galeppi stony sandy loam, 8 to 15 percent slopes. This very deep, well drained soil is on dissected alluvial fans and terraces. It formed in alluvium from mixed rock sources. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is 80 to 90 days.

Typically, 1 to 3 percent of the surface is covered with stones, some cobbles, and some pebbles. The surface layer is brown stony sandy loam about 10 inches thick. The subsoil is brown cobbly sandy clay loam about 11 inches thick. The substratum is weakly silica-cemented sandy loam to a depth of 60 inches.

Included in this unit are Oest soils on higher alluvial fan skirts, Barnard soils on tops of terrace remnants, Stodick soils on small upland remnants, and Verdico soils in shallow depressions. The unit is about 5 percent Oest soils, 5 percent Barnard soils, 3 percent Stodick soils, and 2 percent Verdico soils.

Permeability of this Galeppi soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is about 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the high clay content, stones, and the steepness of slope are moderate limitations for use as sites for dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. Heavy equipment is needed to excavate the large stones. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. In some areas, percolation can also be improved by placing the leach line below the least permeable layer.

Steepness of slope, the susceptibility of the soil to frost heaving, and low load-bearing strength are moderate limitations to use of the unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide a stable base. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because the available water capacity of the surface layer is very low. Grazing should be delayed until the soil is firm and the more desirable

plants have achieved sufficient growth to withstand grazing pressure. Clearing brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIs, nonirrigated.

676—Galeppi-Barnard association. This map unit is on dissected alluvial fans and terraces. Elevation is 4,800 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 80 to 100 days.

This unit is 55 percent Galeppi stony sandy loam, 4 to 15 percent slopes, and 30 percent Barnard stony sandy loam, 2 to 8 percent slopes. The Galeppi soil is on the side slopes and near the toe slopes of the alluvial terraces. The Barnard soil is on remnant tops of the alluvial fans.

Included in this unit are Trosi soils on slightly higher alluvial fan remnant tops, Leviathan soils on higher alluvial fan skirts, and Cassiro soils adjacent to drainageways. The unit is about 5 percent Trosi soils, 5 percent Leviathan soils, and 5 percent Cassiro soils.

The Galeppi soil is very deep and well drained. It formed in alluvium from mixed rock sources. Typically, 1 to 3 percent of the surface is covered with stones, some cobbles, and some pebbles. The surface layer is brown stony sandy loam about 9 inches thick. The subsoil is brown sandy clay loam about 27 inches thick. The substratum is weakly silica-cemented sandy loam to a depth of 60 inches.

Permeability of the Galeppi soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is about 60 inches. Runoff is slow to medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Barnard soil is moderately deep and well drained. It formed in alluvium and pedisediment from mixed rock sources. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 15 inches thick. The subsoil is light yellowish brown clay about 11 inches thick. The substratum is a silica-cemented hardpan over gravelly and cobbly alluvium. Depth to the thick hardpan ranges from 20 to 30 inches.

Permeability of the Barnard soil is slow. Available water capacity is low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Galeppi soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is poor because the available water capacity of the surface layer is very low.

The present vegetation in most areas of the Barnard soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by moderately low precipitation, low available water capacity, and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is poor, mainly because of the large stones on the surface.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

The main limitations to use of this unit as sites for roads are low load-bearing strength, steepness of slope, high clay content, and susceptibility to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface and a stable base. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIs, nonirrigated.

681—Reno very stony fine sandy loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on pediments and river terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,800 to 5,300 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 50 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 5 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony fine sandy loam about 2 inches thick. The subsoil is pale brown and light yellowish brown clay about 22 inches thick. The substratum is a strongly silica-cemented hardpan about 23 inches thick over weakly consolidated sediment. Depth to the hardpan ranges from 20 to 40 inches.

Included in this unit are Barnard soils along the upper edge of the unit, Leviathan soils on the lower edge of the terraces, and Northmore soils on lower alluvial fans and north-facing side slopes. The unit is about 4 percent Barnard soils, 6 percent Leviathan soils, and 5 percent Northmore soils.

Permeability of this Reno soil is very slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is slow to medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is the high clay content. The high clay content results in high shrink-swell potential, which can cause structural damage to

buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation, the restricted depth of the root zone over the hardpan, high clay content, and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

683—Reno stony sandy loam, 2 to 8 percent slopes. This moderately deep, well drained soil is on pediments and river terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,800 to 5,300 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 50 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 4 inches thick. The subsoil is pale brown and light yellowish brown clay about 20 inches thick. The substratum is a strongly silica-cemented hardpan about 23 inches thick over weakly consolidated sediment. Depth to the hardpan ranges from 20 to 40 inches.

Included in this unit are Barnard soils along the upper edge of the unit, Leviathan soils near the lower edge of the terraces, and Northmore soils on inset alluvial fans. The unit is about 5 percent Barnard soils, 5 percent Leviathan soils, and 5 percent Northmore soils.

Permeability of this Reno soil is very slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and cheatgrass. The production of forage is limited by the moderately low precipitation, restricted depth of the root zone over the hardpan, high clay content, and very low available water capacity. The suitability of this soil for rangeland seeding is poor. The main limitations for seeding are the very low available water capacity, the abrupt textural boundary, the restricted depth of the root zone over the hardpan, and large stones on the surface. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

730—Stodick very stony loam, 15 to 30 percent slopes. This shallow, well drained soil is on back slopes and side slopes of pediments. It formed in residuum and alluvium derived dominantly from lacustrine sedimentary rocks. Elevation is 4,800 to 5,300 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, 3 to 5 percent of the surface is covered with stones. The surface layer is light brownish gray very stony loam about 4 inches thick. The subsoil is light yellowish brown very gravelly clay loam about 10 inches thick. Interbedded tuff, mudstone, and sandstone are at a depth of 14 inches. Depth to sedimentary bedrock ranges from 14 to 20 inches.

Included in this unit are Chalco soils on the less sloping areas, Galeppi soils near the ends of the higher terraces, Rock outcrop, Verdico soils in slightly concave areas, and severely eroded areas mostly along the California State line. The unit is about 5 percent Chalco soils, 5 percent Galeppi soils, 1 percent Rock outcrop, 3 percent Verdico soils, and 1 percent severely eroded areas.

Permeability of this Stodick soil is moderately slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for construction of dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the shallowness of the soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit

conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the shallowness of the root zone. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

731—Stodick stony loam, 30 to 50 percent slopes. This shallow, well drained soil is on back slopes and side slopes of pediments. It formed in residuum and alluvium derived dominantly from lacustrine sedimentary rocks. Elevation is 4,800 to 5,300 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is pale brown stony loam about 5 inches thick. The subsoil is light yellowish brown very gravelly clay loam about 9 inches thick. Interbedded tuff, mudstone, and sandstone are at a depth of 14 inches. Depth to sedimentary bedrock ranges from 14 to 20 inches.

Included in this unit are Chalco soils on the tops of the pediments, Galeppi soils near the edge of higher terraces, Rock outcrop, Verdico soils on slightly concave slopes of the pediments, and severely eroded areas mostly along the California state line. The unit is about 4 percent Chalco soils, 5 percent Galeppi soils, 1 percent Rock outcrop, 3 percent Verdico soils, and 2 percent severely eroded areas.

Permeability of this Stodick soil is moderately slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If the unit is used for urban development, the main limitation to use as sites for construction of dwellings is the steepness of slope. The main limitations to use of the unit as septic tank absorption fields are the shallowness of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of the soil as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are steepness of slope, the very low available water capacity, and the shallowness of the root zone over bedrock. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

740—Blackwell sandy loam. This very deep, poorly drained soil is on low terraces and flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 4 percent. Elevation is 6,000 to 9,000 feet. The average annual precipitation is about 25 inches, the average annual air temperature is 39 to 41 degrees F, and the average frost-free period is 30 to 50 days.

Typically, the surface layer is grayish brown sandy loam about 11 inches thick. The underlying material to a depth of 60 inches or more is mottled, stratified gravelly coarse sand through clay loam.

Included in this unit are Inville Variant soils on higher terrace remnants near drainageways, Marla soils on alluvial fans, Macareeno soils on higher colluvial fans, and wet muck or peat spots adjacent to seeps. The unit is about 5 percent Inville Variant soils, 4 percent Marla soils, 4 percent Macareeno soils, and 2 percent wet muck or peat spots.

Permeability of this Blackwell soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 6 to 30 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 6 to 30 inches in winter to midsummer. This soil is subject to occasional flooding during periods of rapid snowmelt.

This soil is used for unimproved pasture and range.

The present vegetation in most areas of this soil is mainly willows and sedges. The potential plant community is mainly willows and sedges. The production of forage is limited by the shortness of the frost-free period. Cold soil temperature delays plant growth and readiness for grazing. Grazing should be delayed until the soils are warm and the plants have achieved sufficient growth. The suitability of this soil for rangeland seeding is very poor, mainly because the frost-free period is only 30 to 50 days.

If this unit is used for unimproved pasture, the main limitations are the shortness of the frost-free period and the high water table. The rate of application of irrigation water should be regulated to avoid raising the water table. Grazing when the soil is wet compacts the surface layer and causes poor tilth and excessive runoff. Wetness and cold temperatures limit the choice of plants and the period of cutting or grazing and increase the risk of winterkill.

The main limitations to use of this soil as sites for roads are flooding, susceptibility to frost heaving, and the high water table. Roads should be provided with drainage.

This soil is in capability subclass VIw, nonirrigated.

752—Toiyabe-Corbett-Rock outcrop association, moderately steep. This map unit is on mountainous uplands. Elevation is 5,500 to 7,000 feet. The average annual precipitation is 25 to 35 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 60 to 80 days.

This unit is 40 percent Toiyabe bouldery coarse sand, 15 to 30 percent slopes; 35 percent Corbett bouldery sand, 15 to 30 percent slopes; and 15 percent Rock outcrop. The Toiyabe soil is near ridges; the Corbett soil is on lower, slightly concave slopes; and the Rock outcrop is on tops and ridges.

Included in this unit are Temo soils on high ridges, Witefels soils on higher north-facing slopes, Graufels soils on lower south-facing slopes, and wet seep areas along drainageways. The unit is about 3 percent Temo soils, 3 percent Witefels soils, 3 percent Graufels soils, and 1 percent wet areas.

The Toiyabe soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery coarse sand about 8 inches thick. The underlying material is pale brown gravelly coarse sand about 5 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Toiyabe soil is rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Corbett soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery sand about 8 inches thick. The underlying material is pale brown gravelly loamy coarse sand about 24 inches thick over weathered bedrock. Depth to bedrock ranges from 24 to 40 inches.

Permeability of the Corbett soil is rapid. Available water capacity is very low. Effective rooting depth is 24 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop is mainly granodiorite.

This unit is used as woodland.

The present vegetation in most areas of the Toiyabe soil is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and squawcarpet. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The present vegetation in most areas of the Corbett soil is mainly Jeffrey pine with an understory of antelope bitterbrush, snowbrush ceanothus, and manzanita. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 3,100 cubic feet, or 13,100 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The sandy texture imposes some limitations on the use of equipment and creates a hazard of erosion. Management that minimizes the risk of erosion is essential when harvesting timber. Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

The main limitation to use of this soil as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Corbett soil is in capability subclass VIIs, nonirrigated. The Toiyabe soil is in capability subclass VIIe, nonirrigated.

753—Toiyabe-Corbett-Rock outcrop association, steep. This map unit is on mountainous uplands. Elevation is 5,500 to 7,000 feet. The average annual precipitation is 25 to 35 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 60 to 80 days.

This unit is 55 percent Toiyabe bouldery coarse sand, 30 to 50 percent slopes; 20 percent Corbett bouldery sand, 30 to 50 percent slopes; and 15 percent Rock outcrop. The Toiyabe soil is near ridges; the Corbett soil is on lower, slightly concave slopes; and the Rock outcrop is on tops and ridges.

Included in this unit are Temo soils on high ridges, Witefels soils on higher north-facing slopes, Graufels soils on lower south-facing slopes, and wet seep areas along drainageways. The unit is about 3 percent Temo soils, 3 percent Witefels soils, 3 percent Graufels soils, and 1 percent wet areas.

The Toiyabe soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery coarse sand about 8 inches thick. The underlying material is pale brown coarse sand about 5 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Toiyabe soil is rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Corbett soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery sand about 8 inches thick. The underlying material is pale brown gravelly loamy coarse sand about 24 inches thick over weathered bedrock. Depth to bedrock ranges from 24 to 40 inches.

Permeability of the Corbett soil is rapid. Available water capacity is very low. Effective rooting depth is 24 to 40 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of rounded granodiorite.

This unit is used as woodland.

The present vegetation in most areas of the Toiyabe soil is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and squawcarpet. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The present vegetation in most areas of the Corbett soil is mainly Jeffrey pine with an understory of antelope bitterbrush, snowbrush ceanothus, and manzanita. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 3,100 cubic feet, or 13,100 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The sandy texture of the soils imposes some limitations on the use of equipment and creates a severe hazard of erosion. The steepness of slope limits the kinds of equipment that can be used in forest management. Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

The main limitation to use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Corbett soil is in capability subclass VIIs, nonirrigated. The Toiyabe soil is in capability subclass VIIe, nonirrigated.

754—Toiyabe-Rock outcrop complex, 50 to 70 percent slopes. This map unit is on mountainous uplands. Elevation is 5,500 to 7,000 feet. The average annual precipitation is 25 to 35 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 60 to 80 days.

This unit is 80 percent Toiyabe bouldery coarse sand, 50 to 70 percent slopes, and 10 percent Rock outcrop. The Toiyabe soil is on mountain side slopes, and the Rock outcrop is on small peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Corbett soils on concave slopes, Graufels soils on lower colluvial slopes, and wet seep areas along intermittent drainageways. The unit is about 6 percent Corbett soils, 2 percent Graufels soils, and 2 percent wet areas.

The Toiyabe soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery coarse sand about 9 inches thick. The underlying material to a depth of 13 inches is pale brown gravelly loamy coarse sand. Weathered bedrock is at a depth of 13 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Toiyabe soil is rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rocks as small peaks.

This unit is used as woodland.

The present vegetation in most areas of the Toiyabe soil is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and squawcarpet. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The sandy texture imposes some limitations on the use of equipment and creates a hazard of erosion. Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. The steepness of slope

limits the kinds of equipment that can be used in forest management.

The main limitation to use of this soil as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIe, nonirrigated.

756—Toiyabe-Corbett-Haypress association. This map unit is on mountainous uplands. Elevation is 5,500 to 7,000 feet. The average annual precipitation is 20 to 35 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 60 to 80 days.

This unit is 35 percent Toiyabe bouldery coarse sand, 30 to 50 percent slopes; 30 percent Corbett bouldery sand, 15 to 30 percent slopes; and 20 percent Haypress very bouldery loamy coarse sand, 15 to 50 percent slopes. The Toiyabe soil is near ridges. The Corbett soil is on lower, slightly concave slopes. The Haypress soil is on higher, convex slopes.

Included in this unit are Temo soils near high ridges, Witefels soils on higher north-facing slopes, Graufels soils on lower south-facing slopes, granitic Rock outcrop as peaks and ridges, and wet seep areas along drainageways. The unit is about 3 percent Temo soils, 3 percent Witefels soils, 3 percent Graufels soils, 4 percent Rock outcrop, and 2 percent wet areas. Also included near the California State line are some loamy soils that contain more rock fragments.

The Toiyabe soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery coarse sand about 7 inches thick. The underlying material is pale brown coarse sand about 8 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Toiyabe soil is rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Corbett soil is moderately deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is dark grayish brown bouldery sand about 9 inches thick. The underlying material is pale brown gravelly loamy coarse sand about 25 inches thick over weathered bedrock. Depth to bedrock ranges from 24 to 40 inches.

Permeability of the Corbett soil is rapid. Available water capacity is very low. Effective rooting depth is 24 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Haypress soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 3 to 10 percent of the surface is covered with boulders. The surface layer is dark grayish brown very bouldery loamy coarse sand about 15 inches thick. The underlying material is brown gravelly loamy coarse sand about 31 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Haypress soil is rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation in most areas of the Toiyabe soil is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and squawcarpet. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The present vegetation in most areas of the Corbett soil is mainly Jeffrey pine with an understory of antelope bitterbrush, snowbrush ceanothus, and manzanita. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 3,100 cubic feet, or 13,100 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The present vegetation in most areas of the Haypress soil is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and manzanita. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 3,600 cubic feet, or 16,400 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

In all the soils in this map unit, the steepness of slope limits the kinds of equipment that can be used in forest management. The sandy texture imposes some limitations on the use of equipment and creates a hazard of erosion. Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment.

The main limitation to the use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Toiyabe soil is in capability subclass VIIe, nonirrigated. The Corbett and Haypress soils are in capability subclass VIIs, nonirrigated.

772—Booford very stony sandy loam, 8 to 15 percent slopes. This moderately deep, well drained soil is on upland slopes. It formed in residuum of tuff. Elevation is 5,000 to 6,500 feet. The average annual precipitation is about 16 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 50 to 80 days.

Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 7 inches thick. The subsoil is brown clay to a depth of 25 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Included in this unit are Yuko soils near ridges at lower elevations; Jumbo soils on colluvial, north-facing slopes at higher elevations; and Duckhill Variant soils near higher ridges and on tops. The unit is about 5 percent Yuko soils, 5 percent Jumbo soils, and 5 percent Duckhill Variant soils. Also included near the California State line are areas of soils that have slightly less clay and support conifer trees.

Permeability of this Booford soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is the high clay content, which causes high shrink-swell potential. The high shrink-swell potential can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this unit as septic tank absorption fields are the restricted depth over bedrock and the slowly permeable subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and mountainmahogany. The production of forage is limited by the low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor, mainly because of the large stones on the surface. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

775—Booford very stony loam, 30 to 50 percent slopes. This moderately deep, well drained soil is on upland slopes. It formed in residuum of tuff. Elevation is 5,000 to 6,500 feet. The average annual precipitation is about 16 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 50 to 80 days.

Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 8 inches thick. The subsoil is brown clay to a depth of 25 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Included in this unit are Yuko soils near ridges at lower elevations; Jumbo soils on colluvial, north-facing slopes at higher elevations; and Duckhill Variant soils near higher ridges and on tops. The unit is about 5 percent Yuko soils, 5 percent Jumbo soils, and 5 percent Duckhill Variant soils.

Permeability of this Booford soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for construction of dwellings are the steepness of slope and high clay content. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this soil as septic tank absorption fields are the restricted depth over bedrock, the slowly permeable subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this soil as sites for roads are the steepness of slope, low load-bearing strength, and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and mountainmahogany. The production of forage is limited by the low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. Grazing should be delayed until the soil is firm

and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

780—Bieber stony sandy loam, 0 to 4 percent slopes. This shallow, well drained soil is on terraces and pediments. It formed in alluvium and pedisediment derived from mixed rock sources. Elevation is 4,900 to 5,200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony sandy loam about 8 inches thick. The subsoil is brown clay about 11 inches thick. The substratum to a depth of 25 inches is an indurated hardpan. Depth to the hardpan ranges from 10 to 20 inches. Below the hardpan is highly variable weathered tuff conglomerate and thin plates of duripan.

Included in this unit are Oest soils on higher lying alluvial fans, Leviathan soils on higher terraces, and Barnard soils on level or slightly concave surfaces of terraces. The unit is about 4 percent Oest soils, 4 percent Leviathan soils, and 2 percent Barnard soils.

Permeability of this Bieber soil is very slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, the main limitations to use as sites for dwellings are the high clay content and the hardpan. Heavy equipment is needed to cut through the hardpan. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitations to use of this soil as sites for roads are the hardpan, low load-bearing strength, and high clay content. Deep cuts should be avoided because of the underlying hardpan. Suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity and the shallow root zone. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

782—Bieber stony sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on terraces and pediments. It formed in alluvium and pedisediment derived from mixed rock sources. Elevation is 4,900 to 5,200 feet. The average annual precipitation is about 10 to 14 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony sandy loam about 7 inches thick. The subsoil is brown clay about 12 inches thick. The substratum to a depth of 25 inches or more is an indurated hardpan. Depth to the hardpan ranges from 10 to 20 inches. Weakly consolidated stratified cobbly sandy loam to very gravelly sandy loam is below the hardpan.

Included in this unit are Chalco soils on pediment remnants and Badland on eroded terrace breaks. The unit is about 8 percent Chalco soils and 7 percent Badland.

Permeability of this Bieber soil is very slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for dwellings are the high clay content and the hardpan. Heavy equipment is needed to cut through the hardpan. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the hardpan. In some areas, percolation can be improved by placing the leach line below the hardpan.

The main limitations to use of this soil as sites for roads are the hardpan, low load-bearing strength, and high clay content. Deep cuts should be avoided because of the underlying hardpan. Suitable material should be added to provide a stable base and an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity and the shallow root zone. Grazing should be delayed until the soil is firm and the

more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

800—Truckee silt loam. This very deep, somewhat poorly drained soil is on flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. The elevation is 4,000 to 4,800 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown silt loam about 12 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified sandy loam through silty clay loam.

Included in this unit are Rose Creek soils in stringer channels; Voltaire soils in swales and old slough bottoms; and Truckee soils, which are strongly saline-alkali and occur on lower flood plains. The unit is about 6 percent Rose Creek soils, 4 percent Voltaire soils, and 5 percent Truckee soils.

Permeability of this Truckee soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 30 to 60 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 30 to 60 inches in spring and early summer. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development, crops, pasture, and hayland.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this soil as septic tank absorption fields are the high water table and the moderately slowly permeable underlying material. The absorption field should be designed to avoid raising the water table and polluting the water supplies. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this soil as sites for roads is the susceptibility of the soil to frost heaving. Roads should be provided with drainage and an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the high water table. Under good management including a conservation cropping system, this soil will produce yields of 4 tons per acre of alfalfa, 42 bushels per acre of barley, or 60 bushels per acre of oats. The rate of application of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients.

If this unit is used for hay and pasture, the main limitation is the high water table. The present vegetation is mainly grass. Under a good pasture or hayland management system, the soil will produce yields of 4 tons per acre of alfalfa or 8 animal-unit-months per acre of pasture. The rate of application of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table.

This soil is in capability subclasses IIw, irrigated, and VIw, nonirrigated.

802—Truckee silt loam, strongly saline. This very deep, somewhat poorly drained soil is on flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,000 to 4,800 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown silt loam about 12 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified sandy loam through silty clay loam.

Included in this unit are Fettic soils on low terrace remnants; Voltaire soils in swales; and areas of Truckee slightly saline soils, which are intermixed with areas of this Truckee soil. The unit is about 4 percent Fettic soils, 6 percent Voltaire soils, and 5 percent Truckee soils.

Permeability of this Truckee soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 30 to 60 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 30 to 60 inches in spring and early summer. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. The soil is strongly saline and alkali-affected.

This unit is used for urban development and pasture. It can be used for irrigated crops if it is reclaimed and if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this unit as septic tank absorption fields are the high water table and the moderately slowly permeable underlying material. Absorption fields should be designed to avoid raising the water table and polluting the water supplies. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. If the density of housing is too high, community

sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this soil as sites for roads is the susceptibility of the soil to frost heaving. Roads should be provided with drainage and an adequate wearing surface.

The present vegetation in most areas is mainly black greasewood and grass. Under a good management system, this soil will produce yields of 5.5 animal-unit-months per acre of pasture. If this unit is used for pasture, the main limitations are the high water table and the content of salts and alkali. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for hay and pasture. Shallow-rooted, water-tolerant plants are suited to this soil. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations and to improve forage production. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali.

This soil is in capability subclasses IVw, irrigated, and VIIw, nonirrigated.

805—Truckee sandy loam, gravelly substratum. This very deep, somewhat poorly drained soil is on flood plains. Drainage has been altered. This soil formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,400 to 4,800 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is gray sandy loam about 12 inches thick. The upper 18 inches of the underlying material is gray, stratified sandy loam through silty clay loam. The lower part to a depth of 60 inches is pale brown, stratified gravelly sand through very gravelly sandy loam. Depth to gravelly material ranges from 30 to 40 inches.

Included in this unit are Rose Creek soils that occur as stringer channels on flood plains, Washoe soils on alluvial fan remnants, and Fettic soils on low terrace remnants. The unit is about 4 percent Rose Creek soils, 5 percent Washoe soils, and 6 percent Fettic soils.

Permeability of the Truckee soil is moderately slow in the upper part of the underlying material and rapid in the lower part. Available water capacity is moderate. Effective rooting depth is 60 inches. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. The soil is moderately saline- and alkali-affected.

This unit is used for urban development.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this unit as septic tank absorption fields are the moderately slow permeability in the upper part of the substratum and the rapid permeability in the lower part. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. The leach lines should not be placed in the rapidly permeable layer. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this soil as sites for roads is the susceptibility of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

This soil is not assigned a capability classification.

806—Truckee sandy loam, sandy substratum, strongly saline. This very deep, somewhat poorly drained soil is on flood plains. It formed in alluvium derived from mixed rock sources. Elevation is 4,000 to 4,800 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is gray sandy loam about 12 inches thick. The upper 18 inches of the underlying material is gray, stratified sandy loam and silty clay loam. The lower part to a depth of 60 inches is pale brown, stratified sand through very fine sandy loam. Depth to the sandy layer ranges from 30 to 40 inches.

Included in this unit are Rose Creek soils on slightly higher stringer channels, Washoe soils on low alluvial fan remnants, and Fettic soils on low terrace remnants. The unit is about 5 percent Rose Creek soils, 5 percent Washoe soils, and 5 percent Fettic soils.

Permeability of this Truckee soil is moderately slow in the upper part of the underlying material and rapid in the lower part. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 30 to 60 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 30 to 60 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. The soil is strongly saline- and alkali-affected.

This unit is used for urban development and pasture. It can be used for irrigated crops if it is reclaimed and if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that

can be controlled only by major flood control structures. The main limitations to use of this soil for septic tank absorption fields are the high water table, the moderately slow permeability in the upper part of the underlying material, and the rapid permeability in the lower part. This soil is not suited to septic tank absorption fields unless the water table is lowered by drainage. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. The leach lines should not be placed in the rapidly permeable layer. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this soil as sites for roads is the susceptibility of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly grass. Under a good management system, this soil will produce yields of 6 animal-unit-months per acre of pasture. If this unit is used for pasture, the main limitations are the high water table and the content of salts and alkali. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production and the selection of plants suitable for pasture. Shallow-rooted, water-tolerant plants are suited to this soil. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations and to improve forage production. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali.

This soil is in capability subclasses IVw, irrigated, and VIIw, nonirrigated.

810—Rose Creek fine sandy loam, drained. This very deep, poorly drained soil is on flood plains. Drainage has been altered. The soil formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,000 to 5,000 feet. The average annual precipitation is about 6 to 8 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is grayish brown fine sandy loam about 16 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified very fine sandy loam through gravelly loamy sand.

Included in this unit are Holbrook soils on narrow stringer channels, Truckee soils on lower flood plains, and wet areas. The unit is about 6 percent Holbrook soils, 5 percent Truckee soils, and 4 percent wet areas.

Permeability of this Rose Creek soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited by the water table for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 48 to 72 inches in spring and early summer. Drainage has changed because the water table has dropped as a result of changes in the original course of streams or of channel entrenchment. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and crops.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The use of this soil as septic tank absorption fields is moderately limited by flooding and the high water table. Dikes and channels that have outlets to bypass floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this soil as sites for roads is the susceptibility of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the high water table. Under good management including a conservation cropping system, this soil will produce 5 tons per acre of alfalfa, 73 bushels per acre of barley, or 360 hundredweight per acre of potatoes. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients. Crops respond to nitrogen and phosphorus fertilizer.

This soil is in capability subclasses IIw, irrigated, and VIw, nonirrigated.

812—Rose Creek loamy fine sand, drained. This very deep, poorly drained soil is on flood plains. Drainage has been altered. This soil formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,000 to 5,000 feet. The average annual precipitation is about 6 to 8 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is grayish brown loamy fine sand about 15 inches thick. The underlying material to a depth of 60 inches is light brownish gray stratified very fine sandy loam through gravelly loamy sand.

Included in this unit are Holbrook soils on narrow stringer channels, Truckee soils on lower flood plains, and wet areas. The unit is about 5 percent Holbrook soils, 5 percent Truckee soils, and 5 percent wet areas.

Permeability of this Rose Creek soil is moderately rapid. Available water capacity is moderate. Effective

rooting depth is 60 inches for water-tolerant plants but is limited by the water table for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 48 to 72 inches in spring and early summer. Drainage has changed because the water table has dropped as a result of changes in the original course of streams or of channel entrenchment. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and crops.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The use of this soil as septic tank absorption fields is moderately limited by flooding and the high water table. Dikes and channels that have outlets to bypass floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to the use of this soil as sites for roads is the susceptibility of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the high water table. Under good management including a conservation cropping system, 5 tons per acre of alfalfa, 73 bushels per acre of barley, or 360 hundredweight per acre of potatoes may be expected. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients.

This soil is in capability subclasses IIw, irrigated, and VIw, nonirrigated.

813—Rose Creek gravelly fine sandy loam, drained. This very deep, poorly drained soil is on flood plains. Drainage has been altered. This soil formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,000 to 5,000 feet. The average annual precipitation is about 6 to 8 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 120 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly fine sandy loam about 16 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified very fine sandy loam through gravelly loamy sand.

Included in this unit are Holbrook soils on narrow stringer channels, Truckee strongly saline soils on lower flood plains, and wet areas. The unit is about 6 percent Holbrook soils, 6 percent Truckee soils, and 3 percent wet areas.

Permeability of this Rose Creek soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for water-tolerant plants but is limited by the water table for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 48 to 72 inches in spring and summer. Drainage has changed because the water table has dropped as a result of changes in the original course of streams or of channel entrenchment. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and crops.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this soil as septic tank absorption fields are flooding and the high water table. Dikes and channels that have outlets to bypass floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. This soil is not suited to septic tank absorption fields unless the water table is lowered by drainage. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this soil as sites for roads is the susceptibility of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the high water table. Under good management including a conservation cropping system, this soil will produce yields of 5 tons per acre of alfalfa, 73 bushels per acre of barley, or 360 hundredweight per acre of potatoes. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients.

This soil is in capability subclasses IIw, irrigated, and VIw, nonirrigated.

820—Marla loamy sand, 4 to 8 percent slopes. This very deep, poorly drained soil is on alluvial fans. It formed in alluvium derived from mixed but predominantly granitic rocks. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 35 to 40 inches, the average annual air temperature is 40 to 42 degrees F, and the average frost-free period is 60 to 70 days.

Typically, the surface layer is grayish brown loamy sand about 18 inches thick. The upper part of the underlying material is light yellowish brown loamy sand about 26 inches thick. The lower part of the underlying

material to a depth of 60 inches or more is very pale brown loamy sand with strata of loam.

Included in this unit are Blackwell soils in swales and on flood plains, Inville Variant soils on terrace remnants along drainageways, and Macareeno soils on adjacent hills. This unit is about 5 percent Blackwell soils, 5 percent Inville Variant soils, and 2 percent Macareeno soils.

Permeability of this Marla soil is moderately rapid in the upper part of the underlying material and moderately slow below. Available water capacity is low. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 12 to 24 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 12 to 24 inches in spring and early summer. This soil is subject to occasional flooding for brief periods during periods of rapid snowmelt.

This unit is used as woodland.

The present vegetation in most areas is mainly lodgepole pine and Jeffrey pine with an understory of grass. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 5,200 cubic feet, or 24,500 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. This soil is wet in spring. Management operations should be conducted during drier seasons.

Flooding is a limitation to use of this unit as sites for roads. Roads should be provided with drainage.

This soil is in capability subclass VIw, nonirrigated.

821—Marla loamy sand, 0 to 4 percent slopes. This very deep, poorly drained soil is on alluvial fans. It formed in alluvium derived from mixed but predominantly granitic rocks. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 35 to 40 inches, the average annual air temperature is 40 to 42 degrees F, and the average frost-free period is 60 to 70 days.

Typically, the surface layer is grayish brown loamy sand about 18 inches thick. The upper part of the underlying material is light yellowish brown loamy sand about 26 inches thick. The lower part of the underlying material to a depth of 60 inches or more is very pale brown loamy sand with thin strata of loam.

Included in this unit are Blackwell soils in swales and on flood plains and Inville Variant soils on terrace remnants along drainageways. The unit is about 5 percent Blackwell soils and 5 percent Inville Variant soils.

Permeability of this Marla soil is moderately rapid in the upper part of the underlying material and moderately slow in the lower part. Available water capacity is low. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 12 to 24 inches for water-sensitive plants. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. A seasonal high water table is at a depth of 12 to 24 inches in spring and early summer. This soil is subject to occasional flooding for brief periods during periods of rapid snowmelt.

This unit is used as woodland.

The present vegetation in most areas is mainly lodgepole pine and Jeffrey pine with an understory of grass. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 5,200 cubic feet, or 24,500 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. This soil is wet in the spring. Management operations should be conducted in drier periods.

Flooding is a limitation to use of this soil as sites for roads. Roads should be provided with drainage.

This soil is in capability subclass VIw, nonirrigated.

830—Fettic silty clay loam. This very deep, poorly drained soil is on low terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 4,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, the surface layer is dark grayish brown silty clay loam about 1 inch thick. The subsoil is grayish brown clay loam about 20 inches thick. The substratum to a depth of 60 inches or more is light brownish gray stratified fine sandy loam through clay.

Included in this unit are Voltaire soils on flood plains and Truckee soils on flood plains. The unit is about 8 percent Voltaire soils and 7 percent Truckee soils.

Permeability of this Fettic soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 20 to 40 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 20 to 40 inches in spring and early summer. This soil is subject to flooding during storms of prolonged high intensity. This soil is moderately saline- and alkali-affected.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this soil as septic tank absorption fields are the high water table and the very slowly permeable subsoil. Absorption fields should be designed to avoid raising the water table and polluting the water supplies. The limitation of very slow permeability can be reduced by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and susceptibility

of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide a stable base.

The present vegetation in most areas is mainly saltgrass and basin wildrye. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of the concentration of salt and alkali. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

This soil is in capability subclass VIIw, nonirrigated.

831—Fettic loam. This very deep, poorly drained soil is on low terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 4,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 95 to 110 days.

Typically, the surface layer is dark grayish brown loam 4 inches thick. The subsoil is grayish brown clay loam about 16 inches thick. The substratum to a depth of 60 inches or more is light brownish gray fine sandy loam.

Included in this unit are Voltaire soils on lower flood plains and Truckee soils on flood plains. The unit is about 8 percent Voltaire soils and 7 percent Truckee soils.

Permeability of this Fettic soil is very slow. Available water capacity is high. Effective rooting depth is 60 inches for water-tolerant plants but is limited to 20 to 40 inches for water-sensitive plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 20 to 40 inches in spring and early summer. This soil is subject to flash flooding during storms of unusually high intensity. It is slightly salt- and alkali-affected in the surface layer and moderately salt- and alkali-affected in the substratum.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitations to use of this soil as septic tank absorption fields are the high water table and the very slowly permeable subsoil. Absorption fields should be designed to avoid raising the existing water table and polluting the water supplies. The limitation imposed by very slow permeability can be reduced by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitations to use of this soil as sites for roads are the low load-bearing strength and susceptibility of the soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide a stable base.

The present vegetation in most areas is mainly black greasewood, saltgrass, and basin wildrye. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of the concentration of salt and alkali. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

This soil is in capability subclass VIIw, nonirrigated.

840—Temo-Witefels-Rock outcrop association. This map unit is on mountainous uplands. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 35 to 50 inches, the average annual air temperature is 39 to 41 degrees F, and the average frost-free period is less than 80 days.

This unit is 50 percent Temo bouldery coarse sand, 30 to 50 percent slopes; 20 percent Witefels gravelly coarse sand, 30 to 50 percent slopes; and 20 percent Rock outcrop. The Temo soil is near ridges and peaks. The Witefels soil is on side slopes. Rock outcrop is on peaks and ridges.

Included in this unit are Corbett soils at lower elevations; Graylock soils on colluvial slopes; Toiyabe soils on lower, south-facing ridges; and wet areas along intermittent streams and in snowdrift areas. The unit is about 3 percent Corbett soils, 3 percent Graylock soils, 2 percent Toiyabe soils, and 2 percent wet areas.

The Temo soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rocks. Typically, 1 to 3 percent of the surface is covered with boulders. The surface layer is grayish brown bouldery coarse sand about 10 inches thick. The underlying material to a depth of 16 inches is pale brown gravelly loamy coarse sand. Weathered bedrock is at a depth of 16 inches. Depth to weathered bedrock ranges from 8 to 20 inches.

Permeability of the Temo soil is rapid. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Witefels soil is moderately deep and somewhat excessively drained. It formed in residuum derived mainly from granitic rocks. Typically, 15 to 35 percent of the surface is covered with pebbles and a few cobbles. The surface layer is grayish brown gravelly coarse sand about 8 inches thick. The underlying material to a depth of 35 inches is pale brown gravelly loamy coarse sand. Weathered bedrock is at a depth of 35 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Witefels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium to rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rocks as peaks and ridges.

This unit is used as woodland.

The present vegetation in most areas of the Temo soil is mainly Jeffrey pine, white fir, and California red fir with an understory of pinemat manzanita, squawcarpet, and snowbrush ceanothus. This soil is suited to white fir and California red fir. If planted to white fir or California red fir, it can produce about 9,350 cubic feet, or 55,100 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The present vegetation in most areas of the Witefels soil is mainly Jeffrey pine and white fir with an understory of pinemat manzanita, snowbrush ceanothus, and squawcarpet. This soil is suited to Jeffrey pine, white fir, and California red fir. If planted to Jeffrey pine, it can produce about 1,960 cubic feet, or 7,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

In this map unit, the sandy texture imposes some limitations on the use of equipment and creates a severe hazard of erosion. Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. The steepness of slope limits the kinds of equipment that can be used in forest management.

The main limitation to use of the soils as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Temo soil is in capability subclass VIIe, nonirrigated. The Witefels soil is in capability subclass VIIs, nonirrigated.

850—Washoe gravelly sandy loam, 0 to 4 percent slopes. This very deep, well drained soil is on terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 4,800 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 15 to 30 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly sandy loam about 8 inches thick. The subsoil is light brown very gravelly sandy loam and very gravelly sandy clay loam about 30 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown very gravelly loamy coarse sand.

Included in this unit are Oest soils along the upper edge of the unit, Orr soils on the nearly level tops of the terrace remnants, and Truckee soils in swales. The unit is about 5 percent Oest soils, 5 percent Orr soils, and 5 percent Truckee soils.

Permeability of this Washoe soil is moderately slow in the subsoil and very rapid in the substratum. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

If this unit is used for urban development, high clay content is a moderate limitation to use as sites for dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings.

The main limitations to use of this soil as septic tank absorption fields are the moderately slow permeability of the subsoil and the very rapid permeability of the substratum. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. The leach lines should not be placed in the substratum. Because the substratum is very rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

The main limitations to the use of this soil as sites for roads are the susceptibility of the soil to frost heaving and the high clay content. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush. The production of forage is limited by low precipitation. The suitability of this soil for rangeland seeding is rated as poor, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIIe, irrigated, and VIs, nonirrigated.

861—Reywat extremely stony loam, 15 to 30 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum from basic igneous rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 50 percent of the surface is covered with stones. The surface layer is grayish brown extremely stony loam about 6 inches thick. The subsoil is brown very gravelly clay loam about 12 inches thick. Bedrock is at a depth of 18 inches. Depth to bedrock ranges from 10 to 20 inches.

Included in this unit are Yuko soils on south-facing slopes; Old Camp soils near ridges and peaks; Risley soils on lower, colluvial slopes; and Tristan soils on north- and east-facing concave slopes. The unit is about 5 percent Yuko soils, 4 percent Old Camp soils, 3 percent Risley soils, and 3 percent Tristan soils.

Permeability of the Reywat soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the shallowness of the root zone, and large stones on the surface. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough soil is left to protect the unit from excessive erosion.

The main limitations to use of this soil as sites for roads are the restricted depth to bedrock and the steepness of slope. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIs, nonirrigated.

862—Reywat very cobbly sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum of basic igneous rocks. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 35 to 50 percent of the surface is covered with cobbles. The surface layer is grayish brown very cobbly sandy loam about 6 inches thick. The subsoil is brown very gravelly clay loam about 12 inches thick. Bedrock is at a depth of 18 inches. Depth to bedrock ranges from 10 to 20 inches.

Included in this unit are Yuko soils on south-facing slopes, Old Camp soils near ridges and peaks, and Risley soils on north- and east-facing concave slopes. The unit is about 4 percent Yuko soils, 3 percent Old Camp soils, and 3 percent Risley soils.

Permeability of this Reywat soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to construction of dwellings is the shallowness of this soil over bedrock. Heavy equipment is needed to cut into the bedrock. The main limitation to use of this unit as septic tank absorption fields is the shallowness of this soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this unit as sites for roads is the shallowness over bedrock. Deep cuts should be avoided because of the underlying bedrock.

The present vegetation in most areas is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by moderately low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the shallowness of the root zone, the large stones on the surface, and the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

863—Reywat-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on mountainous uplands. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 60 percent Reywat extremely stony loam, 15 to 50 percent slopes, and 25 percent Rock outcrop. The Reywat soil is on mountain side slopes, and the Rock outcrop is on ridges and small peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Yuko soils on south-facing slopes; Old Camp soils near ridges and peaks; Risley soils on lower, colluvial slopes; and Tristan soils on north- and east-facing concave slopes. The unit is about 5 percent Yuko soils, 4 percent Old Camp soils, 3 percent Risley soils, and 3 percent Tristan soils.

The Reywat soil is shallow and well drained. It formed in residuum of basic igneous rocks. Typically, 15 to 50 percent of the surface is covered with stones. The surface layer is grayish brown extremely stony loam about 6 inches thick. The subsoil is brown very gravelly clay loam about 8 inches thick. Bedrock is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of this Reywat soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop is basic igneous rock that occurs in the form of rim rocks and prominences.

This unit is used as rangeland.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the shallowness of the root zone over bedrock, steepness of slope, and large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are depth to bedrock and steepness of slope. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

870—Xman-Rock outcrop complex, 4 to 15 percent slopes. This map unit is on uplands. Elevation is 4,400 to 5,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 65 percent Xman extremely stony sandy loam, 4 to 15 percent slopes, and 20 percent Rock outcrop. The Xman soil is on side slopes of uplands, and the Rock outcrop is on ridges and peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Risley soils on colluvial slopes, Old Camp soils near ridges, Wedekind soils on north-facing ridges, and Manogue soils in shallow depressions. The unit is about 5 percent Risley soils, 5 percent Old Camp soils, 3 percent Wedekind soils, and 2 percent Manogue soils.

The Xman soil is shallow and well drained. It formed in residuum derived dominantly from altered volcanic rock. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is grayish brown extremely stony sandy loam about 3 inches thick. The subsoil is brown clay about 11 inches thick. Weathered bedrock is at a depth of 14 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of altered volcanic rock as ridges and small peaks.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitation to use as sites for dwellings is the high clay content. The high clay content can result in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water so that the soil near buildings is kept dry. The main limitation to use of this unit as septic tank absorption fields is the shallowness of the soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to the use of this unit as sites for roads are the low load-bearing strength and high clay content. If roads are built across areas of this unit, suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. The production of forage is limited by the low precipitation, the very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the shallowness of the root zone over bedrock, and the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

871—Xman very stony loam, 15 to 30 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from altered volcanic rocks. Elevation is 4,400 to 5,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 3 inches thick. The subsoil is brown clay about 12 inches thick. Weathered bedrock is at a

depth of 14 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Included in this unit are Risley soils on colluvial slopes, Old Camp soils on ridges, Manogue soils in shallow depressions, and Rock outcrop as ridges or peaks. The unit is about 5 percent Risley soils, about 5 percent Old Camp soils, about 3 percent Manogue soils, and about 2 percent Rock outcrop.

Permeability of this Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitations to use as sites for dwellings are the steepness of slope and high clay content. The high clay content can result in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water so that the soil near buildings is kept dry. The main limitations to use of this unit as septic tank absorption fields are the shallowness of the soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, high clay content, and steepness of slope. Suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the abrupt textural boundary, and the shallowness of the root zone. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

872—Xman very stony sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from altered volcanic rock. Elevation is 4,400 to 5,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 2 inches thick. The subsoil is brown clay about 12 inches thick. Weathered bedrock is at a depth of 14 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Included in this unit are Risley soils on colluvial slopes, Old Camp soils on ridges, Manogue soils in shallow depressions, and Rock outcrop that occurs as ridges or peaks. The unit is about 4 percent Risley soils, 5 percent Old Camp soils, 3 percent Manogue soils, and 3 percent Rock outcrop.

Permeability of this Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitation to use as sites for dwellings is the high clay content. The high clay content can result in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water so that the soil near buildings is kept dry. The main limitation to use of this unit as septic tank absorption fields is the shallowness of the soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the shallowness of the root zone over bedrock, and the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

873—Xman-Rock outcrop complex, 30 to 50 percent slopes. This map unit is on uplands. Elevation is 4,400 to 5,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air

temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 60 percent Xman extremely stony sandy loam, 30 to 50 percent slopes, and 25 percent Rock outcrop. The Xman soil is on side slopes of uplands. Rock outcrop is on ridges and peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Risley soils on colluvial slopes, Old Camp soils on ridges, and Manogue soils in shallow depressions. The unit is about 6 percent Risley soils, 5 percent Old Camp soils, and 4 percent Manogue soils.

The Xman soil is shallow and well drained. It formed in residuum derived dominantly from altered volcanic rock. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is grayish brown extremely stony sandy loam about 4 inches thick. The subsoil is brown clay about 10 inches thick. Weathered bedrock is at a depth of 14 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of altered volcanic rock as small peaks or ridges.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the main limitations to use as sites for dwellings are the high clay content and the steepness of slope. The high clay content can result in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and diverting water so that the soil near buildings is kept dry.

The main limitations to use of this unit as septic tank absorption fields are the shallowness of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this soil as sites for roads are the low load-bearing strength, high clay content, and steepness of slope. If roads are built across areas of this unit, suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly low sagebrush and cheatgrass. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of the soil for rangeland seeding is very poor, mainly because of steepness of slope, the very low available water capacity, the shallowness of the root zone, and large stones on the surface. Steepness of slope limits access by livestock and promotes overgrazing of the less sloping areas. Livestock should be managed so that sufficient vegetation is left to protect the soil from excessive erosion. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This Xman soil is in capability subclass VIIs, nonirrigated.

875—Xman-Zephan-Mizel association. This map unit is on uplands. Elevation is 4,500 to 5,600 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

This unit is 35 percent Xman very stony loam, 15 to 50 percent slopes; 25 percent Zephan very stony sandy loam, 15 to 50 percent slopes; and 25 percent Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes. The Xman soil is on higher, smooth upland slopes. The Zephan soil is on lower upland slopes. The Mizel soil is on south-facing slopes and on tops.

Included in this unit are Old Camp soils on ridges, Reywat soils on east- and north-facing upland slopes, Yuko soils on rounded, south-facing ridges, Risley soils on smooth to slightly convex slopes, and Rock outcrop that occurs as peaks and ridges. The unit is about 3 percent Old Camp soils, 4 percent Reywat soils, 3 percent Yuko soils, 3 percent Risley soils, and 2 percent Rock outcrop.

The Xman soil is shallow and well drained. It formed in residuum derived dominantly from volcanic rocks. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 12 inches thick. Weathered, altered andesite is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Zephan soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from rhyolite and andesite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 8 inches thick. The subsoil is brown very cobbly clay about 27 inches thick. Highly weathered bedrock is at a depth of 35 inches. Depth to bedrock ranges from 25 to 40 inches.

Permeability of the Zephan soil is slow. Available water capacity is low. Effective rooting depth is 25 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Mizel soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 50 to 60 percent of the surface is covered with gravel. The surface layer is very pale brown very gravelly coarse sandy loam about 3 inches thick. Hard rhyolite is at a depth of 3 inches. Depth to bedrock ranges from 3 to 10 inches.

Permeability of the Mizel soil is moderate. Available water capacity is very low. Effective rooting depth is 3 to 10 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Xman soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the abrupt textural boundary, and the shallowness of the root zone.

The present vegetation in most areas of the Zephan soil is mainly big sagebrush and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope.

The present vegetation in most areas of the Mizel soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, steepness of slope, and the shallowness of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are the steepness of slope, high clay content, low load-bearing strength, and restricted depth over bedrock. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The soils in this unit are in capability subclass VIIs, nonirrigated.

876—Xman-Oppio-Old Camp association. This map unit is on uplands. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 35 percent Xman very stony loam, 15 to 50 percent slopes; 30 percent Oppio very stony fine sandy loam, 15 to 50 percent slopes; and 20 percent Old Camp extremely stony sandy loam, 30 to 50 percent slopes. The Xman soil is on the more rounded tops and just below ridges. The Oppio soil is on smooth, lower slopes. The Old Camp soil is on narrow ridges.

Included in this unit are Reywat soils on east- and north-facing upland slopes; Yuko soils on south-facing slopes; Skedaddle soils on convex, eroded side slopes of ridges; and Rock outcrop that occurs as peaks and ridges. The unit is about 2 percent Reywat soils, 4 percent Yuko soils, 5 percent Skedaddle soils, and 4 percent Rock outcrop.

The Xman soil is shallow and well drained. It formed in residuum derived dominantly from volcanic rocks. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 12 inches thick. Weathered, altered andesite is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Oppio soil is moderately deep and well drained. It formed in residuum derived dominantly from andesite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony fine sandy loam about 6 inches thick. The subsoil is brown gravelly clay about 21 inches thick. Hard, fractured bedrock is at a depth of 27 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Oppio soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Old Camp soil is shallow and well drained. It formed in residuum derived dominantly from volcanic rock. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is pale brown extremely stony sandy loam about 2 inches thick. The subsoil is brown very cobbly clay loam about 12 inches thick. Hard andesite is at a depth of 14 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Old Camp soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Xman soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, steepness of slope, shallowness of the root zone over bedrock, and the abrupt textural boundary.

The present vegetation in most areas of the Oppio soil is mainly low sagebrush and Douglas rabbitbrush. The production of forage is limited by the low precipitation, very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation, steepness of slope, and large stones on the surface.

The present vegetation in most areas of the Old Camp soil is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the shallowness of the root zone over bedrock, steepness of slope, and large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are the steepness of slope, low load-bearing strength, high clay content, stones, and restricted depth to bedrock. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The Oppio soil is in capability subclass VIs, nonirrigated. The Xman and Old Camp soils are in capability subclass VIIs, nonirrigated.

877—Xman-Frodo-Mizel association. This map unit is on uplands. Elevation is 4,500 to 5,600 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 35 percent Xman very stony loam, 15 to 50 percent slopes; 25 percent Frodo very stony loam, 8 to 30 percent slopes; and 25 percent Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes. The Xman soil is on smooth slopes. The Frodo soil is on smooth, north- and east-facing plateau remnants. The Mizel soil is on south-facing slopes and rounded hilltops.

Included in this unit are Old Camp soils on ridges, Reywat soils on sharp north- and east-facing slopes, Yuko soils on shoulders of south-facing ridges, Risley soils on lower colluvial slopes, and Rock outcrop that occurs as peaks and ridges. The unit is about 5 percent Old Camp soils, 2 percent Reywat soils, 1 percent Yuko soils, 4 percent Risley soils, and 3 percent Rock outcrop.

The Xman soil is shallow and well drained. It formed in residuum derived dominantly from volcanic rock. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 12 inches thick. Weathered, altered andesite is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Frodo soil is shallow and well drained. It formed in residuum and colluvium derived from volcanic rock. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony loam about 6 inches thick. The subsoil is brown clay about 12 inches thick. A continuous, strongly cemented duripan is at a depth of 18 inches. Depth to the duripan ranges from 14 to 20 inches. Below the duripan is hard bedrock.

Permeability of the Frodo soil is slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Mizel soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 50 to 60 percent of the surface is covered with gravel. The surface layer is very pale brown very gravelly coarse sandy loam about 3 inches thick. Hard rhyolite is at a depth of 3 inches. Depth to bedrock ranges from 3 to 10 inches.

Permeability of the Mizel soil is moderate. Available water capacity is very low. Effective rooting depth is 3 to 10 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Xman soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this Xman soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the shallowness of the root zone, steepness of slope, and the abrupt textural boundary.

The present vegetation in most areas of the Frodo soil is mainly low sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over the hardpan. The

suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the shallowness of the root zone over the hardpan.

The present vegetation in most areas of the Mizel soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, steepness of slope, and the shallowness of the root zone over the hardpan.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope limits access by livestock and promotes overgrazing of the less sloping areas. Livestock should be managed so that sufficient vegetation is left to protect the soils from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope, low load-bearing strength, high clay content, and shallowness of the soils over bedrock. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in the less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The soils in this unit are in capability subclass VIIs, nonirrigated.

880—Zephan-Rock outcrop-Smallcone complex, 15 to 50 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 30 percent Zephan very gravelly sandy loam, 15 to 50 percent slopes; 30 percent Rock outcrop; and 25 percent Smallcone very gravelly sandy loam, 15 to 50 percent slopes. The Zephan soil is on smooth side slopes of uplands. The Rock outcrop is on ridges and peaks. The Smallcone soil is on rounded hilltops and spur ridges. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Yuko soils on rounded, south-facing shoulders of ridges and Xman soils on smooth or slightly concave slopes. The unit is about 8 percent Yuko soils and 7 percent Xman soils.

The Zephan soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from rhyolite and altered andesite. Typically, 35 to 45 percent of the surface is covered with gravel. The surface layer is brown very gravelly sandy loam about 8 inches thick. The subsoil is brown very cobbly clay about 27 inches thick. Weathered bedrock is at a depth of 35 inches. Depth to weathered bedrock ranges from 25 to 40 inches.

Permeability of the Zephan soil is slow. Available water capacity is low. Effective rooting depth is 24 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of rhyolitic and andesitic rocks as peaks and ridges.

The Smallcone soil is very shallow and well drained. It formed in residuum derived dominantly from altered andesite. Typically, the Smallcone soil is very pale brown very gravelly sandy loam about 6 inches deep over hard altered volcanic bedrock. Depth to weathered andesite ranges from 4 to 10 inches.

Permeability of the Smallcone soil is rapid. Available water capacity is very low. Effective rooting depth is 4 to 10 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as woodland and rangeland.

The present vegetation in most areas of the Zephan soil is mainly big sagebrush and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The present vegetation in most areas of the Smallcone soil is a sparse stand of Jeffrey pine with an extremely thin understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of merchantable timber is very low, and natural regeneration of trees is difficult because of the shallowness of the soil, the marginal precipitation, and plant competition. If the woodland is to be maintained, only selective harvesting should be practiced. Management that minimizes the risk of erosion during harvesting of timber is essential. Steepness of slope limits the kinds of equipment that can be used.

The main limitations to use of this unit as sites for roads are the steepness of slope, low load-bearing strength, and high clay content. Suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be located in less slopiong areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

881—Zephan very gravelly sandy loam, 30 to 50 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum and colluvium derived dominantly from rhyolite and altered andesite.

Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is brown very gravelly sandy loam about 8 inches thick. The subsoil is brown very cobbly clay about 27 inches thick. Highly weathered bedrock is at a depth of 35 inches. Depth to bedrock ranges from 25 to 40 inches.

Included in this unit are Yuko soils on rounded shoulders of ridges, Xman soils on smooth or slightly concave slopes near ridges, and Rock outcrop that occurs as small peaks or ridges. The unit is about 6 percent Yuko soils, 5 percent Xman soils, and 4 percent Rock outcrop.

Permeability of this Zephan soil is slow. Available water capacity is low. Effective rooting depth is 25 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitations to use of this unit as sites for dwellings are the steepness of slope and high clay content. The high clay content can result in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and diverting water so that the soil near buildings is kept dry.

The main limitations to use of this unit as septic tank absorption fields are the restricted depth of the soil over bedrock, the slowly permeable subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, high clay content, and steepness of slope. If roads are built across areas of this soil, suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

882—Zephan stony sandy loam, 15 to 30 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum and colluvium derived dominantly from rhyolite and altered andesite. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 47 to 51 degrees F, and the frost-free period is 100 to 110 days.

Typically, 2 to 3 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 8 inches thick. The subsoil is brown very cobbly clay about 27 inches thick. Highly weathered bedrock is at a depth of 35 inches. Depth to highly weathered bedrock ranges from 25 to 40 inches.

Included in this unit are shallow Yuko soils on rounded shoulders of ridges, Xman soils on smooth or slightly concave slopes near ridges, and Rock outcrop that occurs as small peaks or ridges. The unit is about 6 percent Yuko soils, 5 percent Xman soils, and 4 percent Rock outcrop.

Permeability of this Zephan soil is slow. Available water capacity is low. Effective rooting depth is 25 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitations to use of this unit as sites for dwellings are the steepness of slope and high clay content. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water so that the soil near buildings is kept dry.

The main limitations to use of this soil as septic tank absorption fields are the restricted depth of the soil over bedrock, the slowly permeable subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, high clay content, and steepness of slope. Suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush and bottlebrush squirreltail. Scattered

throughout the areas is a small amount of juniper. The production of forage is limited by the moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor, mainly because of the moderately low precipitation and steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

890—Indiano gravelly loam, warm, 15 to 30 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum derived dominantly from volcanic and metavolcanic rocks. Elevation is 4,800 to 5,000 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 15 to 30 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly loam about 14 inches thick. The subsoil is yellowish brown clay loam about 15 inches thick. Bedrock is at a depth of 29 inches. Depth to bedrock ranges from 20 to 40 inches.

Included in this unit are Zephan soils on lower, colluvial slopes; Wedekind soils on north- and east-facing slopes; and Koontz soils on ridges. The unit is about 5 percent Zephan soils, 5 percent Wedekind soils, and 5 percent Koontz soils.

Permeability of this Indiano soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitation to use as sites for dwellings is the steepness of slope. The moderately high shrink-swell potential of this soil can cause structural damage to buildings. Structural damage can be prevented by properly designing foundations and footings and diverting water so that the soil near buildings is kept dry.

The main limitation to use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Nevada bluegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, restricted depth of the root zone over bedrock, and the moderate available water capacity. The suitability of this soil for rangeland seeding is fair. The main limitations to seeding are the moderately low precipitation and the restricted depth of the root zone over bedrock. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIe, nonirrigated.

891—Indiano gravelly loam, warm, 30 to 50 percent slopes. This moderately deep, well drained soil is on uplands. It formed in residuum derived dominantly from metavolcanic rocks. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 110 days.

Typically, 25 to 35 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly loam about 14 inches thick. The subsoil is yellowish brown clay loam about 15 inches thick. Bedrock is at a depth of 29 inches. Depth to bedrock ranges from 20 to 40 inches.

Included in this unit are Zephan soils on lower, colluvial slopes; Koontz soils on ridges; and Wedekind soils on north- and east-facing slopes. The unit is about 5 percent Zephan soils, 5 percent Koontz soils, and 5 percent Wedekind soils.

Permeability of this Indiano soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

If this soil is used for urban development, the main limitation to use as sites for dwellings is the steepness of slope. The moderately high shrink-swell potential of this soil can cause structural damage to buildings. Structural damage can be prevented by properly designing foundations and footings and diverting water so that the soil near buildings is kept dry.

The main limitations to use of this unit as septic tank absorption fields are the restricted depth of the soil over bedrock, the moderately slowly permeable subsoil, and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this soil as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Nevada bluegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, moderate available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIe, nonirrigated.

892—Indiano-Koontz-Flex association. This map unit is on uplands. Elevation is 5,000 to 5,500 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 35 percent Indiano gravelly loam, warm, 30 to 50 percent slopes; 30 percent Koontz cobbly loam, 30 to 50 percent slopes; and 20 percent Flex very gravelly sandy loam, 30 to 50 percent slopes. The Indiano soil is on side slopes. The Koontz soil is on north- and east-facing slopes of ridges. The Flex soil is on south- and west-facing slopes of ridges.

Included in this unit are Burnborough soils on higher north slopes where snow pockets form; Ticino soils, which support mountainmahogany and occur on higher ridges; Old Camp soils on ridges; Wedekind soils on north- and east-facing slopes; and Gabica soils on high, windswept ridges. The unit is about 3 percent Burnborough soils, 2 percent Ticino soils, 4 percent Old Camp soils, 4 percent Wedekind soils, and 2 percent Gabica soils.

The Indiano soil is moderately deep and well drained. It formed in residuum derived dominantly from metavolcanic rocks. Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly loam about 13 inches thick. The subsoil is yellowish brown clay loam about 20 inches thick. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Indiano soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Koontz soil is shallow and well drained. It formed in residuum derived dominantly from metamorphic rocks. Typically, 15 to 25 percent of the surface is covered with cobbles. The surface layer is brown cobbly loam about 6 inches thick. The subsoil is brown and yellowish brown very gravelly clay loam about 12 inches thick. Depth to weathered bedrock ranges from 14 to 20 inches.

Permeability of the Koontz soil is moderately slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Flex soil is shallow and well drained. It formed in residuum derived dominantly from andesite and metavolcanic rocks. Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is light brownish gray very gravelly sandy loam about 3 inches thick. The subsoil is brown very gravelly sandy loam about 7 inches thick. Highly weathered bedrock is at a depth of 10 inches. Depth to bedrock ranges from 6 to 12 inches.

Permeability of the Flex soil is moderate. Available water capacity is very low. Effective rooting depth is 6 to 12 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Indiano soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, moderate available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope.

The present vegetation in most areas of the Koontz soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the shallowness of the root zone over bedrock, and steepness of slope.

The present vegetation in most areas of the Flex soil is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, the shallowness of the root zone, and steepness of slope.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitation to use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Indiano soil is in capability subclass VIIe, nonirrigated. The Koontz and Flex soils are in capability subclass VIIs, nonirrigated.

893—Indiano-Duco-Cagle association. This map unit is on uplands. Elevation is 5,400 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 35 percent Indiano stony fine sandy loam, 15 to 30 percent slopes; 30 percent Duco very stony sandy loam, 30 to 50 percent slopes; and 20 percent Cagle very stony clay loam, 15 to 30 percent slopes. The Indiano soil is on slightly convex upland slopes. The Duco soil is on ridges. The Cagle soil is on slightly concave upland slopes.

Included in this unit are Nosrac soils on north-facing colluvial slopes, Koontz soils near ridges, Old Camp soils on ridges, Rock outcrop that occurs as small peaks and ridges, and Waspo soils on eroded surfaces. The unit is about 2 percent Nosrac soils, 4 percent Koontz soils, 4 percent Old Camp soils, 2 percent Rock outcrop, and 3 percent Waspo soils.

The Indiano soil is moderately deep and well drained. It formed in residuum derived dominantly from metavolcanic rocks. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony fine sandy loam about 13 inches thick. The subsoil is yellowish brown clay loam about 20 inches thick. Weathered metavolcanic rock is at a depth of 33 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Indiano soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 5 inches thick. The subsoil is brown very cobbly clay loam about 14 inches thick. Bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Cagle soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from andesite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony clay loam about 7 inches thick. The subsoil is brown and pale brown gravelly clay about 16 inches thick. Highly weathered andesite is at a depth of 23 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Indiano soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, moderate available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the moderately low precipitation, steepness of slope, and large stones on the surface.

The present vegetation in most areas of the Duco soil is mainly western juniper and pinyon with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity, the shallowness of the root zone over bedrock, and competition of the trees. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, the steepness of slope, and the shallowness of the root zone. In wooded areas, a mature stand of trees (80 to 100 years) will yield about 4 to 8 cords of wood per acre.

The present vegetation in most areas of the Cagle soil is mainly western juniper and pinyon with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. This soil is rated as very poorly suited to rangeland seeding because of the steepness of slope. In wooded areas, a mature stand of trees (80 to 100 years) will yield about 3 to 6 cords of wood per acre.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope of the Indiano soil, steepness of slope and shallowness over bedrock of the Duco soil, and steepness of slope and high clay content of the Cagle soil. Suitable material should be added to provide an adequate wearing surface. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Indiano soil is in capability subclass VIIe, nonirrigated. The Duco and Cagle soils are in capability subclass VIIs, nonirrigated.

894—Indiano-Duco-Skedaddle association. This map unit is on uplands. Elevation is 4,400 to 7,200 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 40 percent Indiano stony fine sandy loam, 15 to 50 percent slopes; 30 percent Duco very stony sandy loam, 30 to 50 percent slopes; and 15 percent Skedaddle very stony loam, 30 to 70 percent slopes. The Indiano soil is on side slopes. The Duco soil is on ridges. The Skedaddle soil is on eroded south-facing slopes.

Included in this unit are Cagle soils on lower colluvial slopes, Old Camp soils on spur ridges, Ticino soils that occur on ridges and support mountainmahogany, Washoe soils near drainageways, and Rock outcrop as peaks. The unit is about 5 percent Cagle soils, 3 percent Old Camp soils, 2 percent Ticino soils, 3 percent Washoe soils, and 2 percent Rock outcrop.

The Indiano soil is moderately deep and well drained. It formed in residuum derived dominantly from metavolcanic rocks. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony fine sandy loam about 13 inches thick. The subsoil is yellowish brown clay loam about 20 inches thick. Weathered metavolcanic rock is at a depth of 33 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Indiano soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 5 inches thick. The subsoil is brown very cobbly clay loam about 14 inches thick. Bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Skedaddle soil is very shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 5 inches thick. Weathered bedrock is at a depth of 5 inches. Depth to hard bedrock ranges from 4 to 12 inches.

Permeability of the Skedaddle soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 12 inches. Runoff is medium to rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Indiano soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, moderate available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the moderately low precipitation, steepness of slope, and large stones on the surface.

The present vegetation in most areas of the Duco soil is mainly western juniper with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity, the shallowness of the root zone over bedrock, and competition of the trees. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, the steepness of slope, and the shallowness of the root zone. In wooded areas, a mature stand of trees (80 to 100 years) will yield about 4 to 8 cords of wood per acre.

The present vegetation in most areas of the Skedaddle soil is mainly big sagebrush, green ephedra, and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, steepness of slope, large stones on the surface, and shallowness of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope and restricted depth to bedrock. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Indiano soil is in capability subclass VIIe, nonirrigated. The Duco and Skedaddle soils are in capability subclass VIIs, nonirrigated.

895—Indiano-Zephan-Duco association. This map unit is on uplands. Elevation is 5,000 to 7,200 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 35 percent Indiano stony fine sandy loam, 15 to 30 percent slopes; 30 percent Zephan very stony

sandy loam, 15 to 50 percent slopes; and 20 percent Duco very stony sandy loam, 15 to 50 percent slopes. The Indiano soil is on upper parts of upland slopes. The Zephan soil is on lower upland slopes. The Duco soil is on ridges.

Included in this unit are Mizel soils on eroded south-facing slopes; Arzo soils on lower, colluvial slopes; Old Camp soils on ridges; and Wedekind soils on east- and north-facing slopes. The unit is about 4 percent Mizel soils, 4 percent Arzo soils, 3 percent Old Camp soils, and 4 percent Wedekind soils.

The Indiano soil is moderately deep and well drained. It formed in residuum derived dominantly from metavolcanic rocks. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony fine sandy loam about 13 inches thick. The subsoil is yellowish brown clay loam about 20 inches thick. Weathered metavolcanic rock is at a depth of 33 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Indiano soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Zephan soil is moderately deep and well drained. It formed in residuum and colluvium derived from mixed rocks, mostly rhyolite and andesite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 8 inches thick. The subsoil is brown very cobbly clay about 27 inches thick. Highly weathered bedrock is at a depth of 35 inches. Depth to bedrock ranges from 25 to 40 inches.

Permeability of the Zephan soil is slow. Available water capacity is low. Effective rooting depth is 25 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 7 inches thick. The subsoil is brown very cobbly clay loam about 8 inches thick. Bedrock is at a depth of 15 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Indiano soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, moderate available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the moderately low precipitation and large stones on the surface.

The present vegetation in most areas of the Zephan soil is mainly big sagebrush and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope.

The present vegetation in most areas of the Duco soil is mainly western juniper with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity, the shallowness of the root zone over bedrock, and competition of the trees. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, steepness of slope, and shallowness of the root zone. In wooded areas, a mature stand of trees (80 to 100 years) will yield about 4 to 8 cords of wood per acre.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope, high clay content, low load-bearing strength, and restricted depth to bedrock. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The Indiano soil is in capability subclass VIIe, nonirrigated. The Zephan and Duco soils are in capability subclass VIIs, nonirrigated.

900—Flex very gravelly sandy loam, 15 to 30 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from altered andesite and metavolcanic rocks. Elevation is 5,000 to 6,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is light grayish brown very gravelly sandy loam about 3 inches thick. The subsoil is brown very gravelly sandy clay loam about 7 inches thick. Highly weathered bedrock is at a depth of 10

inches. Depth to weathered bedrock ranges from 6 to 12 inches.

Included in this unit are Wedekind soils on smooth north-facing slopes, Yuko soils on rounded shoulders of ridges, Koontz soils on north-facing ridges, and Rock outcrop on ridges and peaks. The unit is about 6 percent Wedekind soils, 4 percent Yuko soils, 3 percent Koontz soils, and 2 percent Rock outcrop.

Permeability of this Flex soil is moderate. Available water capacity is very low. Effective rooting depth is 6 to 12 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the steepness of slope. The main limitations to use of the unit as septic tank absorption fields are the shallowness of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the shallowness of the root zone over bedrock and the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

901—Flex very gravelly sandy loam, 30 to 50 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from altered andesite and metavolcanic rocks. Elevation is 5,000 to 6,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is light grayish brown very gravelly sandy loam about 4 inches thick. The subsoil is brown very gravelly sandy clay loam about 6 inches thick. Highly weathered bedrock is at a depth of 10 inches. Depth to weathered bedrock ranges from 6 to 12 inches.

Included in this unit are Wedekind soils on north-facing slopes, Yuko soils on rounded shoulders of ridges, Koontz soils on ridges, and Rock outcrop, which occurs as ridges and peaks. The unit is about 5 percent Wedekind soils, 4 percent Yuko soils, 3 percent Koontz soils, and 3 percent Rock outcrop.

Permeability of this Flex soil is moderate. Available water capacity is very low. Effective rooting depth is 6 to 12 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the shallowness of the soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope, the shallowness of the root zone over bedrock, and the very low available water capacity of the surface layer. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

903—Flex stony sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from altered andesite and metavolcanic rocks. Elevation is 5,000 to 6,200 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 100 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is light grayish brown stony sandy loam about 3 inches thick. The subsoil is brown very gravelly sandy clay loam about 7 inches thick.

Highly weathered bedrock is at a depth of 10 inches. Depth to weathered bedrock ranges from 6 to 12 inches.

Included in this unit are Wedekind soils on north-facing slopes, Yuko soils on rounded shoulders of ridges, Koontz soils on north-facing ridges, and Rock outcrop as small peaks. The unit is about 5 percent Wedekind soils, 4 percent Yuko soils, 4 percent Koontz soils, and 2 percent Rock outcrop.

Permeability of this Flex soil is moderate. Available water capacity is very low. Effective rooting depth is 6 to 12 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The steepness of slope and shallowness of this soil over bedrock are moderate limitations to use of this unit as sites for dwellings. Heavy equipment is needed to cut into the bedrock. The main limitation to use of the unit as septic tank absorption fields is the shallowness of this soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The shallowness of the soil over bedrock, steepness of slope, and susceptibility of this soil to frost heaving are moderate limitations to use of the unit as sites for roads. Drainage should be provided. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and green ephedra. Forage production is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the shallowness of the root zone and the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

910—Vamp fine sandy loam, slightly saline-alkali. This moderately deep, somewhat poorly drained soil is on flood plains and low terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,400 to 4,600 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown fine sandy loam about 3 inches thick. Below this is a layer of light grayish brown and pale brown, stratified fine sandy loam and loam about 33 inches thick. The next layer is a white strongly cemented hardpan about 6 inches thick. The underlying material to a depth of 60 inches is yellowish brown and light olive gray, stratified loam, sandy loam, and loamy sand. Depth to the hardpan ranges from 20 to 40 inches.

Included in this unit are Truckee soils on lower flood plains and Voltaire soils in shallow depressions on flood plains. The unit is about 8 percent Truckee soils and about 7 percent Voltaire soils.

Permeability of this Vamp soil is moderate. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 30 to 40 inches in spring and early summer. This soil is subject to flooding during prolonged storms of high intensity. Channeling and deposition are common along streambanks. The soil is slightly saline- and alkali-affected.

This unit is used for urban development, crops, pasture, and hayland.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The hardpan and the high water table are limitations for septic tank absorption fields. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. In drained areas, ripping the hardpan improves the suitability of the soil for septic tank absorption fields. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of the unit as sites for roads is the susceptibility of this soil to frost heaving. Roads should be provided with drainage and an adequate wearing surface.

If this unit is used for irrigated crops, the content of salt and alkali, the hardpan, and the high water table are limitations. Under good management that includes a conservation cropping system, this soil will produce yields of 30 bushels per acre of barley. The hardpan can be ripped to increase the depth of the root zone. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid overirrigating and leaching of plant nutrients and to avoid raising the existing water table or creating a perched water table above the hardpan.

The present vegetation in most areas is grass. Under a good management system, this soil will produce yields of 2 tons per acre of alfalfa, 2 tons per acre of improved meadow hay, or 5 animal-unit-months per acre of pasture. If this unit is used for hay and pasture, the main limitations are the content of salt and alkali and the high water table. The high water table limits the leaching of salts from the surface layer. The concentration of salts and alkali in the surface layer limits forage production

and the selection of plants suitable for hay and pasture. Shallow-rooted, water-tolerant plants are suited. Lowering the water table through artificial drainage helps to reduce salt and alkali concentrations and to improve forage production. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the needs of the crop to avoid raising the water table and increasing the concentration of salts and alkali.

This unit is in capability subclasses IIIw, irrigated, and VIw, nonirrigated.

911—Vamp silt loam, strongly saline-alkali. This moderately deep, somewhat poorly drained soil is on flood plains and terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 4,600 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown silt loam about 3 inches thick. Below this is a layer of light grayish brown and pale brown, stratified fine sandy loam and loam about 33 inches thick. The next layer is a white, strongly cemented hardpan about 6 inches thick. The next layer to a depth of 60 inches is yellowish brown and light olive gray, stratified loam, sandy loam, and loamy sand. Depth to the hardpan ranges from 20 to 40 inches.

Included in this unit are Truckee soils on lower flood plains, Voltaire soils in shallow depressions in flood plains, and Fettic soils on low terraces. The unit is about 6 percent Truckee soils, 5 percent Voltaire soils, and 4 percent Fettic soils.

Permeability of this Vamp soil is moderate. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 30 to 40 inches in spring and early summer. This soil is subject to flooding during storms of prolonged high intensity. Channeling and deposition are common along streambanks. The soil is strongly saline- and alkali-affected.

This unit is used for urban development.

Flooding is a limitation to use of the unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of the unit as septic tank absorption fields are the hardpan and the high water table. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. In drained areas, the suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The main limitation to use of this unit as sites for roads is the susceptibility of this soil to frost heaving. Drainage should be provided. Suitable material should be added to provide an adequate wearing surface.

930—Old Camp stony sandy loam, 15 to 30 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from volcanic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 43 to 47 degrees F, and the average frost-free period is 100 to 120 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is pale brown stony sandy loam about 7 inches thick. The subsoil is brown very cobbly clay loam about 10 inches thick. Hard andesite is at a depth of 17 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Included in this unit are Manogue soils in saddles, Xman soils on the less sloping areas, Reywat soils on north-facing slopes, and Rock outcrop as small peaks or ridges. The unit is about 3 percent Manogue soils, 4 percent Xman soils, 4 percent Reywat soils, and 4 percent Rock outcrop.

Permeability of this Old Camp soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitations for construction of dwellings are the steepness of slope, stones, and the shallowness of this soil over bedrock. Heavy equipment is needed to cut into the bedrock and to excavate the large stones. The main limitations to use of this unit as septic tank absorption fields are the shallowness of this soil over bedrock, the steepness of slope, and large stones in the subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed. Large stones in the soil make preparing sites for absorption fields more difficult and also decrease the suitability of the soil for use as a filter.

The main limitations to use of this unit as sites for roads are the shallowness of this soil over bedrock, the steepness of slope, and stones. Suitable material should be added to provide an adequate wearing surface. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and cheatgrass. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and the shallowness of the root zone. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

931—Old Camp-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 43 to 47 degrees F, and the average frost-free period is 100 to 120 days.

This unit is 50 percent Old Camp extremely stony sandy loam, 30 to 50 percent slopes; 20 percent Old Camp stony sandy loam, 15 to 30 percent slopes; and 20 percent Rock outcrop. The Old Camp extremely stony sandy loam is near Rock outcrop on peaks and ridges. The Old Camp stony sandy loam is on rounded ridges and between peaks. Rock outcrop is on peaks and ridges. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Manogue soils on toe slopes and in saddles, Xman soils in the less sloping areas, and Reywat soils on north-facing slopes. The unit is about 3 percent Manogue soils, 4 percent Xman soils, and 3 percent Reywat soils.

The Old Camp extremely stony soil is shallow and well drained. It formed in residuum derived dominantly from volcanic rock. Slope is 30 to 50 percent. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is pale brown extremely stony sandy loam about 7 inches thick. The subsoil is brown very cobbly clay loam about 10 inches thick. Hard andesite bedrock is at a depth of 17 inches. Depth to hard bedrock ranges from 10 to 20 inches.

The Old Camp stony soil is shallow and well drained. It formed in residuum derived dominantly from volcanic rocks. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is pale brown stony sandy loam about 8 inches thick. The subsoil is brown very cobbly clay loam about 9 inches thick. Hard andesite bedrock is at a depth of 17 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of both Old Camp soils is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of volcanic rock as peaks.

This unit is used for urban development and as rangeland.

The main limitations for construction of dwellings are the steepness of slope, stones, and shallowness of the soils over bedrock. Heavy equipment is needed to cut into the bedrock and to excavate the large stones. The main limitations to use of the unit as septic tank absorption fields are the shallowness of the soils over bedrock, the steepness of slope, and large stones in the subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed. Large stones in the soil make preparing sites for absorption fields more difficult and also decrease the suitability of the soil for use as a filter.

The main limitations to use of this unit as sites for roads are the shallowness of the soils over bedrock, steepness of slope, and stones. Suitable material should be added to provide an adequate wearing surface. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and cheatgrass. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of these soils for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, steepness of slope, and the shallowness of the root zone. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The soils in this unit are in capability subclass VIIs, nonirrigated.

932—Old Camp stony sandy loam, 8 to 15 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from volcanic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 43 to 47 degrees F, and the average frost-free period is 100 to 120 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is pale brown stony sandy loam about 7 inches thick. The subsoil is brown very cobbly clay loam about 10 inches thick. Hard andesite

bedrock is at a depth of 17 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Included in this unit are Manogue soils on toe slopes and in saddles; Xman soils on smooth, less sloping areas; Reywat soils on north-facing slopes; and Rock outcrop, which occurs as small peaks and ridges. The unit is about 3 percent Manogue soils, 4 percent Xman soils, 4 percent Reywat soils, and 4 percent Rock outcrop.

Permeability of this Old Camp soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitations for construction of dwellings are depth to bedrock and stones. Heavy equipment is needed to cut into the bedrock and to excavate the large stones. The main limitations to use of this unit as septic tank absorption fields are the shallowness of the soil over bedrock and large stones in the subsoil. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed. Large stones in the soil make preparing sites for absorption fields more difficult and also decrease the suitability of the soil for use as a filter.

The main limitation to use of this unit as sites for roads is the shallowness of the soil over bedrock and stones. Suitable material should be added to provide an adequate wearing surface. Deep cuts should be avoided because of the underlying bedrock.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and the shallowness of the root zone over bedrock. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

960—Kayo stony sandy loam, 2 to 4 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 11 inches thick. The subsoil is brown very gravelly sandy loam about 11 inches thick. The substratum to a depth of 60 inches or more is brown, stratified very gravelly loamy coarse sand and very gravelly sandy loam.

Included in this unit are Aladshi soils on lower terraces; Indian Creek soils on higher terrace remnants; Stumble soils on small, inset alluvial fans; and Holbrook soils, which occur in drainageways and are flooded in most years for short periods. The unit is about 6 percent Aladshi soils, 4 percent Indian Creek soils, 3 percent Stumble soils, and 2 percent Holbrook soils.

Permeability of this Kayo soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Flooding and the susceptibility of this soil to frost heaving are moderate limitations to use of this soil as sites for roads. Drainage is needed. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly spiny hopsage, big sagebrush, and Indian ricegrass. The production of forage is limited by the low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

961—Kayo stony sandy loam, 4 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 8 to 10 inches, the

average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 11 inches thick. The subsoil is brown very gravelly sandy loam about 11 inches thick. The substratum to a depth of 60 inches or more is brown, stratified very gravelly loamy coarse sand and very gravelly sandy loam.

Included in this unit are Aladshi soils on lower terraces; Indian Creek soils on higher terrace remnants; Stumble soils on small, inset alluvial fans; and Holbrook soils, which occur near drainageways and are subject to flooding in most years. The unit is about 6 percent Aladshi soils, 4 percent Indian Creek soils, 3 percent Stumble soils, and 2 percent Holbrook soils.

Permeability of this Kayo soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Flooding and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Drainage is needed. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and Indian ricegrass. The production of forage is limited by the low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

962—Kayo very stony sandy loam, 4 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 10 inches thick. The subsoil is brown very gravelly sandy loam about 15 inches thick. The substratum to a depth of 60 inches or more is brown, stratified very gravelly loamy coarse sand and very gravelly sandy loam.

Included in this unit are Aladshi soils on lower terrraces; Indian Creek soils on higher terrace remnants, Stumble soils on small, inset alluvial fans; and Holbrook soils, which occur near drainageways and are subject to flooding in most years. The unit is about 6 percent Aladshi soils, 4 percent Indian Creek soils, 3 percent Stumble soils, and 2 percent Holbrook soils.

Permeability of this Kayo soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum, which allows the leachate to run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Flooding and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage and an adequate wearing surface.

The present vegetation in most areas is mainly spiny hopsage, big sagebrush, and Indian ricegrass. The production of forage is limited by the low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

963—Kayo very stony sandy loam, 15 to 30 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans and terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,200 feet. The average annual precipitation is

about 8 to 10 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 11 inches thick. The subsoil is brown very gravelly sandy loam about 11 inches thick. The substratum to a depth of 60 inches or more is brown, stratified very gravelly loamy coarse sand and very gravelly sandy loam.

Included in this unit are Aladshi soils on lower terraces; Indian Creek soils on higher terrace remnants; Stumble soils on small, inset alluvial fans; and Holbrook soils, which occur near drainageways and are subject to flooding in most years. The unit is about 6 percent Aladshi soils, 4 percent Indian Creek soils, 3 percent Stumble soils, and 2 percent Holbrook soils.

Permeability of this Kayo soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland.

Flooding and the steepness of slope are limitations to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitations to use of this unit as septic tank absorption fields are the rapidly permeable substratum and the steepness of slope. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. Care should be taken to prevent surfacing of the leachate downslope.

The main limitation to use of this unit as sites for roads is steepness of slope. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and Indian ricegrass. The production of forage is limited by the low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

971—Aladshi sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans and low stream terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 7 to 9 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

The surface layer is light brownish gray sandy loam about 7 inches thick. The subsoil is brown sandy clay loam about 27 inches thick. The substratum to a depth of 60 inches or more is stratified very gravelly loam to extremely gravelly loamy sand.

Included in this unit are Kayo soils on higher alluvial fan skirts; Indian Creek soils on higher terrace remnants; Turria soils on small, inset alluvial fans; and Holbrook soils, which occur near drainageways and are subject to flooding for short periods in most years. The unit is about 6 percent Kayo soils, 4 percent Indian Creek soils, 3 percent Turria soils, and 2 percent Holbrook soils.

Permeability of this Aladshi soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

The susceptibility of this soil to frost heaving, the high clay content, and flooding are moderate limitations to use of this unit as sites for roads. Drainage should be provided. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and bottlebrush squirreltail. The production of forage is limited by the low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because the precipitation is low. The intensity and duration of grazing should be adjusted to season of growth and to precipitation.

This soil is in capability subclasses IIe, irrigated, and VIc, nonirrigated.

974—Aladshi gravelly sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,200 feet. The average annual precipitation is about 7 to 9 inches, the

average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is light brownish gray gravelly sandy loam about 6 inches thick. The subsoil is brown sandy clay loam about 28 inches thick. The substratum to a depth of 60 inches or more is stratified very gravelly loam to extremely gravelly loamy sand.

Included in this unit are Kayo soils on higher alluvial fan skirts; Indian Creek soils on higher terrace remnants; Turria soils on small, inset alluvial fans; and Holbrook soils, which occur near drainageways and are subject to flooding for short periods in most years. The unit is about 6 percent Kayo soils, 4 percent Indian Creek soils, 3 percent Turria soils, and 2 percent Holbrook soils.

Permeability of this Aladshi soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

The susceptibility of this soil to frost heaving, high clay content, and flooding are moderate limitations to use of this soil as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and bottlebrush squirreltail. The production of forage is limited by the low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation and the low available water capacity of the surface layer. The intensity and duration of grazing should be adjusted to season of growth and to precipitation.

This soil is in capability subclasses IIIe, irrigated, and VIc, nonirrigated.

980—Koontz gravelly loam, 8 to 15 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from metamorphic rocks. Elevation is 5,300 to 6,300 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 20 to 35 percent of the surface is covered with gravel. The surface layer is brown gravelly loam about 5 inches thick. The subsoil is brown and yellowish brown very gravelly clay loam about 13 inches thick. Weathered, metamorphosed, tuffaceous sediments occur at a depth of 18 inches. Depth to bedrock ranges from 14 to 20 inches.

Included in this unit are Old Camp soils on ridges, Yuko soils on south-facing slopes, and Wedekind soils on north-facing slopes. The unit is about 5 percent Old Camp soils, 5 percent Yuko soils, and 5 percent Wedekind soils.

Permeability of this Koontz soil is moderately slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The high clay content, the steepness of slope, and the shallowness of this soil over bedrock are moderate limitations to use of this unit as sites for dwellings. Heavy equipment is needed to cut into the bedrock. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and diverting water so that the soil near buildings is kept dry. The main limitation to use of this unit as septic tank absorption fields is the shallowness of this soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize this limitation. If the density of housing is too high, however, community sewage systems are needed.

The shallowness of this soil over bedrock, the susceptibility of the soil to frost action, and steepness of slope are the main limitations to use of this unit as sites for roads. Drainage should be provided. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the shallowness of the root zone over bedrock and the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable

plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

982—Koontz stony loam, 15 to 30 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived dominantly from metavolcanic rocks. Elevation is 5,300 to 6,300 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 0.1 to 2 percent of the surface is covered with stones. The surface layer is brown stony loam about 6 inches thick. The subsoil is brown and yellowish brown very gravelly clay loam about 12 inches thick. Weathered, metamorphosed, tuffaceous sediments occur at a depth of 18 inches. Depth to bedrock ranges from 14 to 20 inches.

Included in this unit are Old Camp soils on ridges, Yuko soils on south-facing slopes, and Wedekind soils on north-facing slopes. The unit is about 5 percent Old Camp soils, 5 percent Yuko soils, and 5 percent Wedekind soils.

Permeability of this Koontz soil is moderately slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

The main limitation to use of this unit as sites for dwellings is the steepness of slope. The main limitations to use of this unit as septic tank absorption fields are the shallowness of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitation to the use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the shallowness of the root zone over bedrock and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the shallowness of the root zone and the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Sufficient vegetation should be left to protect the unit from excessive erosion.

This soil is in capability subclass VIIs, nonirrigated.

990—Rock outcrop. Rock outcrop consists of exposed areas of hard bedrock, which commonly occur as peaks but can occur on rims of uplands. These areas do not support vegetation.

991—Xeric Torriorthents-Urban land complex. This complex is about 45 percent nearly level, well drained Xeric Torriorthents, 45 percent Urban land, and 10 percent included soils.

The Xeric Torriorthents portion of this unit consists of artificially filled areas of soil, trash, and rock. The soil characteristics are variable, but most of the material is more than 35 percent nonsoil fragments in a loamy matrix. In some areas, however, the matrix is clayey. Many of these areas are planted to lawns or to landscape plants.

The Urban land is covered by streets, parking lots, buildings, and other structures that so obscure or alter the soils that identification is not feasible.

Included in this unit are areas of unidentified soils and miscellaneous dumps. These areas make up about 10 percent of the unit.

This complex is used for residential, commercial, and other urban developments.

992—Playas. Playas consist of very deep, somewhat poorly drained and moderately well drained soils in nearly level, undrained basins. The soil materials are mostly clay, silty clay, and silty clay loam. Permeability is slow or very slow, and surface runoff is ponded. These soils have a slow intake rate and are covered with shallow water during periods of runoff. Depth to the seasonal high water table ranges from 2 to 6 feet. Salt concentrations vary considerably in these areas.

These areas are used as sites for recreation.

The areas are essentially barren of vegetation except for small patches of alkali weed that grow early in summer in some years. Because of ponding, slow permeability, and high salt content, use of this unit for agriculture is not feasible.

In general, ponding, seasonal high water table, slow permeability, and shrink-swell potential are limitations to use of these soils for all urban uses.

993—Haplaquolls, nearly level. These very deep, very poorly drained soils are on alluvial flood plains. They are wet and are periodically ponded. The soils are reworked, and the texture is highly variable. The soils have a dark surface layer. The vegetation varies from sparse to lush stands of sedges and rushes.

Included in this unit are small areas of aquents, Beaches, and intermittent lakes.

These soils produce food and cover for wetland wildlife. They are mostly used for wildlife habitat.

The seasonal high water table and the periodic ponding are severe limitations to both agricultural and urban uses.

994—Badland-Chalco-Verdico complex, 8 to 30 percent slopes. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 8 to 14 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 40 percent Badland; 25 percent Chalco very stony clay loam, 15 to 30 percent slopes; and 20 percent Verdico extremely stony sandy loam, 8 to 15 percent slopes. Badland is on eroded side slopes. The Chalco soil is on rounded ridges and on side slopes of pediments. The Verdico soil is in shallow depressions on pediments. Areas of these soils are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this map unit are Stodick soils on ridges and hilltops, Reno soils on terrace remnants, and Northmore soils on alluvial fans. The unit is about 5 percent Stodick soils, 5 percent Reno soils, and 5 percent Northmore soils.

Badland consists of highly weathered water-laid tuff, diatomaceous earth, siltstone, and sandstone. It is dissected by intermittent drainage channels. It is essentially barren of vegetation. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

The Chalco soil is shallow and well drained. It formed in pedisediments derived from mixed rock sources.

Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is light brownish gray very stony clay loam about 3 inches thick. The subsoil is dark yellowish brown clay about 12 inches thick. Weathered bedrock is at a depth of 15 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Chalco soil is very slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Verdico soil is moderately deep and well drained. It formed in alluvium from mixed rock sources.

Typically, 15 to 50 percent of the surface is covered with stones. The surface layer is grayish brown extremely stony sandy loam about 2 inches thick. The subsoil is brown clay about 27 inches thick. Weathered bedrock is at a depth of 29 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Verdico soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Chalco soil is mainly low sagebrush, Douglas rabbitbrush, and cheatgrass. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the shallowness of the root zone.

The present vegetation in most areas of the Verdico soil is mainly low sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, low available water capacity, high clay content, and restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the abrupt textural boundary.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

Roads on this unit are limited mainly by low load-bearing strength, high clay content, and steepness of slope. Suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

996—Dune land-Playas complex. This map unit is in enclosed basins in dry lakebeds. Elevation is 3,900 to 4,700 feet. The average annual precipitation is 4 to 8 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 120 days.

This unit is 65 percent Dune land, 4 to 50 percent slopes, and 20 percent Playas. Dune land is on ridges, and Playas are on the bottom of wide, windswept areas. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately.

Included in this map unit are Ruhe soils on higher terrace remnants, Isolde soils on stabilized sand dunes, and Trocken soils on alluvial fans. The unit is about 5 percent Ruhe soils, 5 percent Isolde soils, and 5 percent Trocken soils.

Dune land consists of various sizes of unstable sand dunes. The sand is well sorted, and it is mainly fine sand. Permeability is very rapid. Available water capacity is low. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

Playas are very deep lake deposits. The texture is silty clay loam, silty clay, or clay. Permeability is very slow. Available water capacity is low, mainly because of the high salt content. Runoff is ponded, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The high hazard of soil blowing on Dune land is a severe limitation to most uses. During windy periods, blowing sand must be constantly cleared from all-weather roads. When winds are strong, visibility is zero.

997—Badland. Badland consists of highly weathered, water-laid tuff, diatomaceous earth, siltstone, and sandstone. It is dissected by intermittent drainage channels. It is essentially barren of vegetation. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

Included in this unit are small areas of Chalco soils and Celeton Variant soils.

998—Beaches. Beaches are sandy, gravelly, or cobbly shores washed by the waves of Pyramid Lake. The areas may be partly covered with water during stormy periods.

1010—Gabica very gravelly sandy loam, 8 to 30 percent slopes. This shallow, well drained soil is on uplands. It formed in residuum derived from basalt or other basic igneous rocks. Elevation is 6,000 to 6,800 feet. The average annual precipitation is about 18 to 25 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 70 to 90 days.

Typically, 35 to 45 percent of the surface is covered with gravel. The surface layer is dark grayish brown very gravelly sandy loam about 14 inches thick. The subsoil is dark yellowish brown very cobbly clay loam about 5 inches thick. Hard, fractured bedrock is at a depth of 19 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Included in this unit are Rock outcrop as small peaks and ridges, Ticino soils near rims, and Jorge soils on concave north- or east-facing slopes. The unit is about 6 percent Rock outcrop, 5 percent Ticino soils, and 4 percent Jorge soils.

Permeability of this Gabica soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas is mainly low sagebrush, Douglas rabbitbrush, and muleears. Forage production is limited by the very low available water capacity, shallowness of the root zone over bedrock, the short growing season, and cold spring temperatures. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity of the surface layer and shallowness of the root zone.

Cold soil temperature delays plant growth and readiness for grazing. Grazing should be delayed until the soils are warm and the plants have achieved sufficient growth.

The main limitations to use of this unit as sites for roads are the steepness of slope and depth to bedrock. Deep cuts should be avoided because of the underlying bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIs, nonirrigated.

1040—Orr Variant gravelly sandy loam. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 25 to 35 percent of the surface is covered with gravel. The surface layer is brown gravelly sandy loam about 18 inches thick. The subsoil is light yellowish brown sandy clay loam about 21 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown calcareous silty clay loam.

Included in this unit are Haybourne soils on higher alluvial fan skirts, Greenbrae soils on the lower parts of alluvial fans and on low terraces, and Aquinas soils on higher terrace remnants. The unit is about 5 percent Haybourne soils, 5 percent Greenbrae soils, and 5 percent Aquinas soils.

Permeability of this Orr Variant soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures that protect the soil from such floods are difficult to establish and maintain. The main limitation to use of the unit as septic tank absorption fields is the moderately slow permeability of the subsoil. This limitation can be overcome by increasing the size of the absorption field.

The susceptibility of this soil to frost heaving, high clay content, and flooding are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because of the moderately low precipitation. Grazing should be delayed

until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas to insure uniform grazing. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIc, irrigated, and VIc, nonirrigated.

1041—Orr Variant coarse sandy loam, thin surface. This deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is brown coarse sandy loam about 10 inches thick. The subsoil is light yellowish brown sandy clay loam about 21 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown calcareous silty clay loam.

Included in this unit are Aquinas soils on higher terrace remnants, Doten soils on lower terraces, and Lemm soils on inset alluvial fans. The unit is about 5 percent Aquinas soils, 5 percent Doten soils, and 5 percent Lemm soils.

Permeability of this Orr Variant soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the moderately slow permeability of the subsoil. This limitation can be overcome by increasing the size of the absorption field.

Flooding, the susceptibility of this soil to frost heaving, and the high clay content are moderate limitations to use of this unit as sites for roads. Drainage should be provided. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the moderately low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas to insure uniform grazing. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIc, irrigated and VIc, nonirrigated.

1050—Waspo clay, 15 to 30 percent slopes. This moderately deep, well drained soil is on pediments and uplands. It formed in residuum derived from tuffaceous materials. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is dark grayish brown clay about 7 inches thick. Below this is a buried surface layer of dark grayish brown clay about 17 inches thick. Gray, weathered tuff is at a depth of 24 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Included in this unit are Chalco soils on smooth tops; Reno soils on pediment remnants; and Manogue soils on slightly concave, less sloping areas. The unit is about 6 percent Chalco soils, 5 percent Reno soils, and 4 percent Manogue soils.

Permeability of this Waspo soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for rangeland.

The present vegetation in most areas is mainly Douglas rabbitbrush, big sagebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor, mainly because of the steepness of slope. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion.

The main limitation to the use of this unit as sites for roads are the low load-bearing strength, steepness of slope, and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIs, nonirrigated.

1051—Waspo stony clay, 30 to 50 percent slopes. This moderately deep, well drained soil is on pediments and uplands. It formed in residuum derived from tuffaceous materials. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 50

degrees F, and the average frost-free period is 100 to 110 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony clay about 7 inches thick. Below this is a buried surface layer of dark grayish brown clay about 17 inches thick. Gray, weathered tuff is at a depth of 24 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Included in this unit are Chalco soils on the tops of pediments, Reno soils on pediment remnants, and Manogue soils on less sloping, slightly concave slopes. The unit is about 6 percent Chalco soils, 5 percent Reno soils, and 4 percent Manogue soils.

Permeability of this Waspo soil is very slow. Available water capacity is low. Effective rooting depth is 24 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used for rangeland.

The present vegetation in most areas is mainly Douglas rabbitbrush, big sagebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. This soil is rated as very poorly suited to rangeland seeding, mainly because of steepness of slope. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that sufficient vegetation is left to protect the soil from excessive erosion.

The main limitations to the use of this unit as sites for roads are the low load-bearing strength, steepness of slope, and high clay content. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIe, nonirrigated.

1052—Waspo-Rock outcrop complex, 30 to 50 percent slopes. This map unit is on pediments and uplands. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 10 to 12 inches, the average air temperature is 49 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 60 percent Waspo stony clay, 30 to 50 percent slopes, and 25 percent Rock outcrop. The Waspo soil is on pediments and uplands. Rock outcrop is on narrow ridges and peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Chalco soils on tops of pediments and Reno soils on pediment remnants. Also included near Mogul is an area of Acrelane soils. The unit is about 8 percent Chalco soils and 7 percent Reno soils.

The Waspo soil is moderately deep and well drained. It formed in residuum derived from tuffaceous materials. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony clay about 9 inches thick. The underlying material to a depth of 26 inches is dark grayish brown clay. Gray, weathered tuff is at a depth of 26 inches. Depth to weathered tuff ranges from 20 to 40 inches.

Permeability of the Waspo soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of andesite as narrow ridges or peaks.

This unit is used for urban development and as rangeland.

The main limitations to use of this unit as sites for dwellings are the steepness of slope and high clay content. The high clay content can cause high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and diverting water so that the soil near buildings is kept dry. The main limitations to use of this unit as septic tank absorption fields are the restricted depth of this soil over bedrock and the steepness of slope. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength, steepness of slope, and high clay content. Suitable material should be added to strengthen the base and provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly Douglas rabbitbrush, big sagebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock.

This soil is rated as very poorly suited to rangeland seeding, mainly because of steepness of slope. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that sufficient vegetation is left to protect the soil from excessive erosion.

This soil is in capability subclass VIIe, nonirrigated.

1054—Waspo gravelly clay, 2 to 8 percent slopes. This moderately deep, well drained soil is on pediments and uplands. It formed in residuum derived from tuffaceous materials. Elevation is 4,800 to 5,200 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 49 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 25 percent of the surface is covered with gravel. The surface layer is dark grayish brown gravelly clay about 6 inches thick. The underlying material to a depth of 23 inches is dark grayish brown clay. Gray, weathered tuff is at a depth of 23 inches. Depth to gray, weathered tuff ranges from 20 to 40 inches.

Included in this unit are Chalco soils on pediment tops, Reno soils on pediment remnants, and Manogue soils on slightly concave slopes. The unit is about 5 percent Chalco soils, 5 percent Reno soils, and 5 percent Manogue soils.

Permeability of this Waspo soil is very slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

The main limitation to use of this unit as sites for dwellings is high clay content. The high clay content can cause high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the restricted depth of this soil over bedrock. The soil above the bedrock is too thin to permit conventional design of absorption fields. Inadequately filtered effluent can surface downslope or seep through cracks of the rock into the ground water. Increasing the volume of soil used for filtering can minimize these limitations. If the density of housing is too high, however, community sewage systems are needed.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, low available water capacity, and the root zone restriction of the bedrock. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are the moderately low precipitation and the restricted depth of the root zone over bedrock. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

1060—Witefels-Rock outcrop complex, 15 to 30 percent slopes. This map unit is on mountainous uplands. Elevation is 7,500 to 9,500 feet. The average annual precipitation is about 40 inches, the average annual air temperature is 39 to 40 degrees F, and the average frost-free period is less than 80 days.

This unit is 70 percent Witefels coarse sand, 15 to 30 percent slopes, and 20 percent Rock outcrop. The Witefels soil is on side slopes. Rock outcrop is on peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Temo soils near ridges and peaks and Graylock soils on lower colluvial slopes. Also included are areas that are wet in spring. The unit is about 4 percent Temo soils, 3 percent Graylock soils, and 3 percent areas that are wet in spring.

The Witefels soil is moderately deep and somewhat excessively drained. It formed in residuum derived mainly from granitic rock. The surface layer is grayish brown coarse sand about 8 inches thick. The underlying material to a depth of 35 inches is pale brown gravelly coarse sand. Weathered bedrock is at a depth of 35 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Witefels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rock.

This unit is used as woodland.

The present vegetation on the Witefels soil is mainly Jeffrey pine and white fir with an understory of pinemat manzanita, snowbrush ceanothus, and squawcarpet. This soil is suited to Jeffrey pine, white fir, and California red fir. If planted to Jeffrey pine, the soil can produce about 1,960 cubic feet, or 7,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. The sandy texture of the soil imposes some limitations on the use of equipment and creates a severe hazard of erosion. Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. Management that minimizes the risk of erosion during harvesting is essential.

The main limitation to the use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soil in this unit is in capability subclass VIIs, nonirrigated.

1062—Witefels-Rock outcrop complex, 50 to 70 percent slopes. This map unit is on mountainous uplands. Elevation is 7,500 to 9,500 feet. The average annual precipitation is about 40 inches, the average annual air temperature is 39 to 40 degrees F, and the average frost-free period is less than 80 days.

This unit is 70 percent Witefels coarse sand, 50 to 70 percent slopes, and 20 percent Rock outcrop. The Witefels soil is on side slopes and Rock outcrop is on peaks and ridges. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Temo soils near ridges and peaks and Graylock soils on lower colluvial slopes. The unit is about 4 percent Temo soils and 3 percent Graylock soils. Also included is a soil that occurs in snow pockets and is wet in spring. This soil makes up about 3 percent of the unit.

The Witefels soil is moderately deep and somewhat excessively drained. It formed in residuum derived mainly from granitic rocks. The surface layer is grayish brown coarse sand about 8 inches thick. The underlying material to a depth of 35 inches is pale brown gravelly coarse sand. Weathered bedrock is at a depth of 35 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Witefels soil is rapid. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rock.

This unit is used for woodland.

The present vegetation on the Witefels soil is mainly Jeffrey pine and white fir with an understory of pinemat manzanita, snowbrush ceanothus, and squawcarpet. This soil is suited to Jeffrey pine, white fir, and California red fir. If planted to Jeffrey pine, it can produce about 1,960 cubic feet, or 7,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The sandy texture of the soil and the steepness of slope limit some equipment use and create an erosion hazard. Management that minimizes the risk of erosion during harvesting is essential. Stones on the surface and the Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment.

Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soil in this unit is in capability subclass VIIs, nonirrigated.

1080—Inville Variant gravelly sandy loam, 2 to 8 percent slopes. This very deep, somewhat poorly drained soil is on terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 6,000 to 7,400 feet. The average annual precipitation is 20 to 30 inches, the average annual air temperature is 41 to 45 degrees F, and the average frost-free period is 50 to 80 days.

Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is brown gravelly sandy loam about 8 inches thick. The subsoil is dark brown very gravelly loam about 17 inches thick. The substratum to a depth is 78 inches is strong brown gravelly sandy clay loam with many mottles.

Included in this unit are Blackwell soils on flood plains, Jorge soils on foot slopes of uplands, and Apmat soils on higher-lying alluvial fans. The unit is about 5 percent Blackwell soils, 5 percent Jorge soils, and 5 percent Apmat soils.

Permeability of this Inville Variant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The seasonal high water table is at a depth of 30 to 40 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity or during periods of high snowmelt. Channeling and deposition are common along streambanks.

This unit is used as woodland.

The present vegetation in most areas is mainly lodgepole pine with an understory of snowbrush ceanothus and arrowleaf balsamroot. If planted to lodgepole pine, the soil can produce about 3,860 cubic feet, or 15,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. This soil is wet in spring. Management operations should be conducted during the drier seasons.

The main limitation to use of this unit as sites for roads is the susceptibility of this soil to frost heaving. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

This soil is in capability subclass VIw, nonirrigated.

1090—Railcity very bouldery coarse sand, 15 to 50 percent slopes. This very deep, somewhat excessively drained soil is on old landslides. It formed in colluvium derived dominantly from granitic rocks. Elevation is 5,500 to 7,000 feet. The average annual precipitation is 12 to 20 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 50 to 100 days.

Typically, 3 to 15 percent of the surface is covered with boulders. The surface layer is grayish brown very bouldery coarse sand about 6 inches thick. The

underlying material to a depth of 60 inches is yellowish brown very gravelly coarse sand through sandy loam.

Included in this unit are Apmat soils on alluvial fans; Temo soils on high ridge remnants; Corbett soils on higher, smooth, east- and north-facing slopes; and Rock outcrop as peaks. The unit is about 4 percent Apmat soils, 4 percent Temo soils, 4 percent Corbett soils, and 3 percent Rock outcrop.

Permeability of this Railcity soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used for woodland.

The present vegetation in most areas is mainly Jeffrey pine with an understory of manzanita, antelope bitterbrush, and big sagebrush. This soil is suited to Jeffrey pine. If it is planted to Jeffrey pine, the soil can produce about 4,270 cubic feet, or 19,700 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. Management that minimizes the risk of erosion during harvesting timber is essential. Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. The steepness of slope limits the kinds of equipment that can be used in forest management.

The main limitation to the use of this soil as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIs, nonirrigated.

1091—Railcity very bouldery coarse sand, 8 to 15 percent slopes. This very deep, somewhat excessively drained soil is on old landslides. It formed in colluvium derived dominantly from granitic rocks. Elevation is 5,050 to 6,000 feet. The average annual precipitation is 12 to 20 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 50 to 100 days.

Typically, 3 to 15 percent of the surface is covered with boulders. The surface layer is grayish brown very bouldery coarse sand about 6 inches thick. The underlying material to a depth of 60 inches is yellowish brown, stratified very gravelly coarse sand through sandy loam.

Included in this unit are Apmat soils on alluvial fans; Temo soils on high ridge remnants; Corbett soils on higher, smooth slopes; and Rock outcrop, which occurs as peaks. The unit is about 4 percent Apmat soils, 4 percent Temo soils, 4 percent Corbett soils, and 3 percent Rock outcrop.

Permeability of this Railcity soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation in most areas is mainly Jeffrey pine with an understory of antelope bitterbrush, big sagebrush, and manzanita. This soil is suited to Jeffrey pine. If it is planted to Jeffrey pine, the soil can produce about 4,270 cubic feet, or 19,700 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

The main limitation to use of this soil as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIs, nonirrigated.

1100—Graylock-Temo-Rock outcrop complex, 30 to 70 percent slopes. This map unit is on mountainous uplands. Elevation is 6,500 to 9,000 feet. The average annual precipitation is 35 to 50 inches, the average annual air temperature is 39 to 41 degrees F, and the average frost-free period is less than 80 days.

This unit is 50 percent Graylock bouldery loamy sand, 30 to 70 percent slopes; 25 percent Temo bouldery coarse sand, 30 to 50 percent slopes; and 10 percent Rock outcrop. The Graylock soil is on side slopes of uplands, the Temo soil is on ridges, and Rock outcrop is on peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Witefels soils on smooth slopes at higher elevations; Corbett soils on smooth slopes at lower elevations; and Toiyabe soils on lower, south-facing ridges. The unit is about 5 percent Witefels soils, 5 percent Corbett soils, and 5 percent Toiyabe soils.

The Graylock soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, 1 to 3 percent of the surface is covered with boulders. The surface is grayish brown bouldery loamy sand about 10 inches thick. The underlying material to a depth of 60 inches is pale brown very gravelly loamy sand. Fractured bedrock is at a depth of 60 inches. Depth to bedrock ranges from 40 to 60 inches.

Permeability of the Graylock soil is rapid. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Temo soil is shallow and excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, 1 to 3 percent of the surface is covered

with boulders. The surface layer is grayish brown bouldery coarse sand about 10 inches thick. The underlying material to a depth of 16 inches is pale brown gravelly loamy coarse sand. Granitic gruss is at a depth of 16 inches. Depth to bedrock ranges from 8 to 20 inches.

Permeability of the Temo soil is rapid. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rock as peaks or ridges.

This unit is used as woodland.

The present vegetation in most areas of the Graylock soil is mainly lodgepole pine and whitebark pine with an understory of big sagebrush, lupine, and muleears. If planted to California red fir, the soil can produce about 9,350 cubic feet, or 55,100 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The present vegetation in most areas of the Temo soil is mainly Jeffrey pine, white fir, and California red fir with an understory of pinemat manzanita, squawcarpet, and snowbrush ceanothus. This soil is suited to white fir and California red fir. If it is planted to white fir or California red fir, the soil can produce about 9,350 cubic feet, or 55,100 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

Stones on the surface and the presence of Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. The sandy texture of the soil imposes some limitations on the use of equipment and creates a hazard of erosion. Management that minimizes the risk of erosion is essential when harvesting timber.

The main limitation to the use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Graylock soil is in capability subclass VIIs, nonirrigated. The Temo soil is in capability subclass VIIe, nonirrigated.

1120—Apmat very stony coarse sand, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in glacial outwash and till derived mainly from volcanic rocks. Elevation is 5,400 to 7,000 feet. The average annual precipitation is about 20 to 35 inches, the average annual air temperature is 41 to 44 degrees F, and the average frost-free period is 50 to 80 days.

Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony coarse sand about 10 inches thick. The subsurface layer is light brownish gray very gravelly loamy sand about 11 inches thick. The subsoil is yellowish brown very stony sandy loam about 34 inches thick. The substratum to a depth of 60 inches is extremely bouldery loamy coarse sand.

Included in this unit are Oest soils on terraces and alluvial fans at lower elevations, Notus soils near streams, Jumbo soils on colluvial slopes of uplands, and Fraval soils on uplands. The unit is about 4 percent Oest soils, 3 percent Notus soils, 4 percent Jumbo soils, and 4 percent Fraval soils.

Permeability of this Apmat soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is low. Effective rooting depth is more than 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as woodland.

Stoniness is a moderate limitation to use of this unit as sites for dwellings. Heavy equipment is needed to excavate the large stones. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

The susceptibility of this soil to frost heaving and stoniness are moderate limitations to use of this unit as sites for roads. Suitable material should be added to provide an adequate surface. Drainage should be provided.

The present vegetation in most areas is mainly Jeffrey pine with an understory of antelope bitterbrush, big sagebrush, and squawcarpet. In harvested or burned areas, the vegetation is dominantly understory plants. If planted to Jeffrey pine, the soil can produce about 2,800 cubic feet, or 11,900 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. Stones on the surface can interfere with felling, yarding, and other operations involving the use of equipment. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

This soil is in capability subclass VIIs, nonirrigated.

1121—Apmat gravelly sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in glacial outwash and till derived mainly from volcanic rocks. Elevation is 5,900 to 7,500 feet. The average annual precipitation is about 20 to 35 inches, the average annual air temperature is 41 to 44 degrees F, and the average frost-free period is 50 to 80 days.

Typically, 3 to 15 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly

sandy loam about 10 inches thick. The subsurface layer is light brownish gray very gravelly loamy sand about 11 inches thick. The subsoil is yellowish brown very stony sandy loam about 34 inches thick. The substratum to a depth of 60 inches is extremely bouldery loamy coarse sand.

Included in this unit are Oest soils on terraces and alluvial fans at lower elevations, Inville Variant soils near streams, Jumbo soils on colluvial slopes of uplands, and Fraval soils on remnant ridges of uplands. The unit is about 4 percent Oest soils, 3 percent Inville Variant, 4 percent Jumbo soils, and 4 percent Fraval soils.

Permeability of this Apmat soil is moderately rapid. Available water capacity is low. Effective rooting depth is more than 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation is mainly Jeffrey pine with an understory of antelope bitterbrush, big sagebrush, and squawcarpet. This soil is suited to Jeffrey pine. If it is planted to Jeffrey pine, the soil can produce about 2,800 cubic feet, or 11,900 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The susceptibility of this soil to frost heaving and the stones are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

This soil is in capability subclass VIIs, nonirrigated.

1130—Dithod sandy loam. This very deep soil with altered drainage is on flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,350 to 4,500 feet. The average annual precipitation is about 6 to 8 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 15 inches thick. The lower part to a depth of 60 inches is stratified loamy fine sand to clay loam.

Included in this unit are Voltaire soils on lower, slightly concave parts of flood plains; Vamp soils on slightly higher terrace remnants; and Rose Creek soils near the upper parts of stream channels. The unit is about 5 percent Voltaire soils, 5 percent Vamp soils, and 5 percent Rose Creek soils.

Permeability of this Dithod soil is moderately slow. Available water capacity is high. Effective rooting depth is more than 60 inches. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The seasonal high water table is at a depth of 48 to 72 inches in late winter and spring. This soil is subject to flooding during storms of prolonged high intensity.

This unit is used for urban development, crops, pasture, and hay.

Flooding is a limitation to use of this unit as sites for dwellings. This soil is subject to seasonal flooding that can be controlled only by major flood control structures. The main limitations to use of this unit as septic tank absorption fields are the high water table and the moderately slow permeability of the subsoil. This soil is suited to septic tank absorption fields only if the water table is lowered by drainage. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

Flooding, the susceptibility of this soil to frost heaving, and the high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

If this unit is used for irrigated crops, the main limitation is the high water table. Under good management including a conservation cropping system, this soil can produce yields of 4 tons per acre of alfalfa, 60 bushels per acre of barley, or 70 bushels per acre of spring wheat. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating and leaching of plant nutrients.

If this unit is used for hay and pasture, the main limitation is the high water table. Shallow-rooted, water-tolerant plants are suited to this soil. The present vegetation is mainly grass. Under a good pasture or hayland management system, this unit can produce yields of 4 tons per acre of alfalfa or 8 animal-unit-months per acre of pasture. Irrigation water must be carefully applied to avoid raising the water table.

This soil is in capability subclasses IIw, irrigated, and VIw, nonirrigated.

1141—Bedell loamy sand, 2 to 4 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived mainly from granitic rock. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is brown loamy sand about 15 inches thick. The subsoil is yellowish brown sandy loam about 39 inches thick. The substratum to a depth of 60 inches is yellowish brown loamy coarse sand.

Included in this unit are Linhart soils on inset alluvial fans, Orr soils on higher terrace remnants, and Wedertz soils on toe slopes of alluvial fans. The unit is about 5 percent Linhart soils, 5 percent Orr soils, and 5 percent Wedertz soils.

Permeability of this Bedell soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity of the soil is low. Effective rooting depth is more than 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

Flooding and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, Anderson peachbrush, and Indian ricegrass. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas to insure uniform grazing. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIe, irrigated, and VIIs, nonirrigated.

1142—Bedell loamy sand, 4 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived mainly from granitic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the average annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is brown loamy sand about 15 inches thick. The subsoil is yellowish brown sandy loam about 39 inches thick. The lower part to a depth of 60 inches is yellowish brown loamy coarse sand.

Included in this unit are Linhart soils on inset alluvial fans, Orr soils on higher terrace remnants, and Wedertz soils on the toe slopes of alluvial fans. The unit is about 5 percent Linhart soils, 5 percent Orr soils, and 5 percent Wedertz soils.

Permeability of this Bedell soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity of the soil is low. Effective rooting depth is more than 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain.

The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

Flooding and susceptibility to frost heaving are moderate limitations to the use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, Anderson peachbrush, and Indian ricegrass. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, because of the low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIIe, irrigated, and VIIs, nonirrigated.

1143—Bedell loamy sand, 8 to 15 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived mainly from granitic rocks. Elevation is 4,500 to 6,000 feet. The average annual precipitation is about 8 to 12 inches, the

average annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is brown loamy sand about 14 inches thick. The subsoil is yellowish brown sandy loam about 36 inches thick. The substratum to a depth of 60 inches is yellowish brown loamy coarse sand.

Included in this unit are Linhart soils on inset alluvial fans, Orr soils on higher terrace remnants, and Wedertz soils on toe slopes of the alluvial fans. The unit is about 5 percent Linhart soils, 5 percent Orr soils, and 5 percent Wedertz soils.

Permeability of this Bedell soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity of the soil is low. Effective rooting depth is more than 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the rapidly permeable substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

Steepness of slope, flooding, and the susceptibility of this soil to frost heaving are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, Anderson peachbrush, and Indian ricegrass. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVe, irrigated, and VIIs, nonirrigated.

1160—Jowec silty clay loam. This very deep, well drained soil is on low lake terraces. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,800 to 5,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temprature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is light brownish gray silty clay loam about 2 inches thick. The subsoil is dark yellowish brown clay loam about 18 inches thick. The upper part of the substratum is clay loam about 18 inches thick, and the lower part to a depth of 60 inches is stratified loam and sandy loam.

Included in this unit are Mellor soils on lower terraces; Turria soils, which are near drainageways and are subject to occasional flooding; and Haybourne soils on higher alluvial fan skirts. The unit is about 5 percent Mellor soils, 5 percent Turria soils, and 5 percent Haybourne soils.

Permeability of this Jowec soil is slow. Available water capacity is high. Effective rooting depth is more than 60 inches. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to shallow flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland.

Flooding and the high clay content of this soil are limitations to use of this soil as sites for dwellings. The high clay content can result in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

The main limitations to use of this unit as sites for roads are the low load-bearing strength and high clay content. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush and spiny hopsage. The production of forage is limited by the low precipitation and high clay content. The suitability of this soil for rangeland seeding is very poor, mainly because of the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

1161—Jowec sandy loam. This very deep, well drained soil is on low lake terraces. It formed in alluvium derived from mixed rock sources. Slopes are 2 to 4 percent. Elevation is 4,800 to 5,600 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is light brownish gray sandy loam about 2 inches thick. The subsoil is dark yellowish brown clay about 18 inches thick. The upper part of the substratum is clay loam about 18 inches thick, and the lower part to a depth of 60 inches is stratified loam and sandy loam.

Included in this unit are Mellor soils on lower terraces; Turria soils, which occur near drainageways and are subject to occasional flooding; and Haybourne soils on higher alluvial fan skirts. The unit is about 5 percent Mellor soils, 5 percent Turria soils, and 5 percent Haybourne soils.

Permeability of this Jowec soil is slow. Available water capacity is high. Effective rooting depth is more than 60 inches. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to shallow flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland.

Flooding and the high clay content of this soil are limitations to use of this unit as sites for dwellings. The high clay content results in high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this unit as septic tank absorption fields is the slow permeability in the subsoil and upper part of the substratum. This limitation can be overcome by increasing the size of the absorption field. Percolation can also be improved in some areas by placing the leach line below the least permeable layer.

The high clay content and low load-bearing strength are the main limitations for roads. Suitable material should be added to strengthen the base and provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the low precipitation and high clay content. The suitability of this soil for rangeland seeding is very poor, mainly because of the abrupt textural boundary. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIIs, nonirrigated.

1170—Wedertz sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown sandy loam about 6 inches thick. The subsoil is brown sandy clay loam about 16 inches thick. The upper 12 inches of the substratum is pale brown, weakly cemented sandy loam. The lower part to a depth of 60 inches is pale brown gravelly loamy sand. Depth to weak silica cementation ranges from 20 to 35 inches.

Included in this unit are Aquinas soils on higher terrace remnants, Greenbrae soils near the ends of alluvial fans and on lower terraces, and Jowec soils in shallow depressions of lower terraces. The unit is about 5 percent Aquinas soils, 5 percent Greenbrae soils, and 5 percent Jowec soils.

Permeability of this Wedertz soil is moderately slow in the subsoil and upper part of the substratum and rapid in the lower part of the substratum. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this soil as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitations to use of this unit as septic tank absorption fields are the moderately slow permeability in the subsoil and upper part of the substratum and the rapid permeability in the lower part of the substratum. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. The leach lines should not be placed into the rapidly permeable part of the substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Flooding, the susceptibility of this soil to frost heaving, and high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and Indian ricegrass. The production of forage is limited by the low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation and the very low available water capacity of the surface

layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIe, irrigated, and VIc, nonirrigated.

1171—Wedertz sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown sandy loam about 8 inches thick. The subsoil is brown sandy clay loam about 23 inches thick. The upper 7 inches of the substratum is pale brown, weakly cemented sandy loam. The lower part to a depth of 60 inches is pale brown gravelly loamy sand. Depth to the weakly cemented layer ranges from 20 to 35 inches.

Included in this unit are Indian Creek soils on higher terrace remnants, Greenbrae soils on lower parts of alluvial fans, Linhart soils near the upper parts of drainageways, and Jowec soils in shallow depressions. The unit is about 5 percent Indian Creek soils, 5 percent Greenbrae soils, 3 percent Linhart soils, and 2 percent Jowec soils.

Permeability of this Wedertz soil is moderately slow in the subsoil and upper 7 inches of the substratum and rapid in the lower part of the substratum. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more.. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitations to use of this unit as septic tank absorption fields are the moderately slow permeability in the subsoil and upper part of the substratum and the rapid permeability in the lower part of the substratum. The limitation imposed by moderately slow permeability can be overcome by increasing the size of the absorption field. The leach lines should not be placed into the rapidly permeable part of the substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Flooding, the susceptibility of this soil to frost heaving, and the high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and Indian ricegrass. The production of forage is limited by the low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation and the low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIIe, irrigated, and VIc, nonirrigated.

1172—Wedertz sand, 2 to 4 percent slopes. This very deep, well drained soil is on alluvial fans and terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,500 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is pale brown sand about 7 inches thick. The subsoil is brown sandy clay loam about 18 inches thick. The upper 6 inches of the substratum is pale brown, weakly cemented sandy loam. The lower part to a depth of 60 inches is pale brown gravelly loamy sand. Depth to weak cementation ranges from 20 to 35 inches.

Included in this unit are Aquinas soils on higher terrace remnants, Greenbrae soils on lower parts of alluvial fans and on lower terraces, and Turria soils on inset alluvial fans. The unit is about 5 percent Aquinas soils, 5 percent Greenbrae soils, and 5 percent Turria soils.

Permeability of this Wedertz soil is moderately slow in the subsoil and upper part of the substratum and rapid in the lower part. Available water capacity of the soil is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures to protect the soil from such floods are difficult to establish and maintain. The main limitations to use of this unit as septic tank absorption fields are the moderately slow permeability of the subsoil and upper part of the substratum and the rapid permeability in the lower part of the substratum. The limitation imposed by moderately

slow permeability can be overcome by increasing the size of the absorption field. The leach lines should not be placed in the rapidly permeable part of the substratum. Because the substratum is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Flooding, the susceptibility of this soil to frost heaving, and the high clay content are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly big sagebrush, littleleaf horsebrush, and Indian ricegrass. The production of forage is limited by the low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

This soil is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated.

1181—Haypress-Tanob-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on uplands. Elevation is 5,700 to 7,500 feet. The average annual precipitation is about 14 to 16 inches, the average annual air temperature is 42 to 47 degrees F, and the average frost-free period is 50 to 65 days.

This unit is 50 percent Haypress very bouldery loamy coarse sand, 15 to 50 percent slopes; 30 percent Tanob gravelly loamy coarse sand, 15 to 30 percent slopes; and 10 percent Rock outcrop. The Haypress soil is on convex side slopes of uplands. The Tanob soil is on saddles and on smooth to slightly concave slopes. Rock outcrop is on peaks. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Railcity soils on colluvial slopes, Acrelane soils on rounded ridges at lower elevations, and Linhart soils on lower canyon bottoms and on lower colluvial slopes. The unit is about 4 percent Railcity soils, 3 percent Acrelane soils, and 3 percent Linhart soils.

The Haypress soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, 3 to 10 percent of the surface is covered with boulders. The surface layer is dark grayish brown very bouldery loamy coarse sand about 15 inches thick. The underlying material to a depth of 46 inches is brown gravelly loamy coarse sand. Weathered bedrock is at a depth of 46 inches. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Haypress soil is rapid. Available water capacity of the soil is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Tanob soil is moderately deep and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is dark grayish brown gravelly loamy coarse sand about 17 inches thick. The subsoil is light yellowish brown sandy loam about 11 inches thick. Weathered bedrock is at a depth of 28 inches. Depth to weathered bedrock ranges from 20 to 30 inches.

Permeability of the Tanob soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rock as small peaks and ridges.

This unit is used as rangeland.

In most areas of the Haypress soil, the present vegetation is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the very low available water capacity, the short growing season, and cold temperature in spring. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and steepness of slope.

In most areas of the Tanob soil, the present vegetation is mainly big sagebrush, antelope bitterbrush, and snowberry. The production of forage is limited by the short growing season, the cold temperature in spring, the very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion. Cold soil temperatures delay plant growth and readiness for grazing. Therefore, grazing should be delayed until the soils are warm and the plants have achieved sufficient growth.

The main limitation to use of this unit as sites for roads is the steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Haypress soil is in capability subclass VIIs, nonirrigated. The Tanob soil is in capability subclass VIIe, nonirrigated.

182—Haypress-Tanob-Rock outcrop association. This map unit is on uplands. Elevation is 5,700 to 7,500 feet. The average annual precipitation is about 14 to 16 inches, the average annual air temperature is 42 to 47

degrees F, and the average frost-free period is 50 to 65 days.

This unit is 60 percent Haypress extremely bouldery loamy coarse sand, 30 to 70 percent slopes; 20 percent Tanob gravelly loamy coarse sand, 8 to 30 percent slopes; and 10 percent Rock outcrop. The Haypress soil is on steep, slightly convex side slopes. The Tanob soil is on saddles between peaks and on smooth, less sloping areas. Rock outcrop is on peaks.

Included in this unit are Toiyabe soils near Rock outcrop, Flex soils on the lower slopes along the contact with altered andesite and metamorphic rock, and Graufels soils on lower south-facing slopes. The unit is about 5 percent Toiyabe soils, 3 percent Flex soils, and 2 percent Graufels soils.

The Haypress soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, 10 to 15 percent of the surface is covered with boulders. The surface layer is dark grayish brown extremely bouldery loamy coarse sand about 15 inches thick. The underlying material to a depth of 40 inches is brown gravelly coarse sand. Weathered bedrock is at a depth of 40 inches. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Haypress soil is rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Tanob soil is moderately deep and well drained. It formed in residuum derived dominantly from granitic rock. Typically, the surface layer is dark brown gravelly loamy coarse sand about 17 inches thick. The subsoil is light yellowish brown sandy loam about 11 inches thick. Weathered bedrock is at a depth of 28 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Tanob soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rock as peaks and ridges.

This unit is used as rangeland.

The present vegetation in most areas of the Haypress soil is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the very low available water capacity, the short growing season, and the cold temperature in spring. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, steepness of slope, and large stones on the surface.

The present vegetation in most areas of the Tanob soil is mainly big sagebrush, antelope bitterbrush, and snowberry. The production of forage is limited by the short growing season, cold temperature in spring, very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that sufficient vegetation is left to protect the unit from excessive erosion. Cold soil temperatures delay plant growth and readiness for grazing. Grazing should be delayed until the soils are warm and the plants have achieved sufficient growth.

The main limitations to use of this unit as sites for roads are steepness of slope of both soils and stones in the Haypress soil. Suitable material should be added to provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Haypress soil is in capability subclass VIIs, nonirrigated. The Tanob soil is in capability subclass VIIe, nonirrigated.

1183—Haypress-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on uplands. Elevation is 5,700 to 7,500 feet. The average annual precipitation is about 14 to 16 inches, the average annual air temperature is 42 to 47 degrees F, and the average frost-free period is 50 to 65 days.

This unit is about 60 percent Haypress very bouldery loamy coarse sand, 15 to 50 percent slopes, and about 25 percent Rock outcrop. The Haypress soil is near ridges and on steep side slopes, and Rock outcrop is on peaks and ridges.

Included in this unit are Toiyabe soils near the Rock outcrop; Acrelane soils on lower, south-facing slopes; and Graufels soils on lower colluvial slopes. The unit is about 5 percent Toiyabe soils, 5 percent Acrelane soils, and 5 percent Graufels soils.

The Haypress soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from granitic rock. Typically, 10 to 15 percent of the surface is covered with boulders. The surface layer is dark grayish brown very bouldery loamy coarse sand about 14 inches thick. The underlying material to a depth of 49 inches is brown gravelly coarse sand. Weathered bedrock is at a depth of 49 inches. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Haypress soil is rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of granitic rock as peaks and ridges.

This unit is used as rangeland.

The present vegetation in most areas of the Haypress soil is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by the very low available water capacity, the short growing season, and cold temperature in spring. The suitability of this soil for rangeland seeding is very poor, mainly

because of the very low available water capacity of the surface layer and steepness of slope.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Cold soil temperature delays plant growth and readiness for grazing. Therefore, grazing should be delayed until the soils are warm and the plants have achieved sufficient growth.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

This complex is in capability subclass VIIs, nonirrigated.

1190—Spasprey sandy loam, 0 to 2 percent slopes. This moderately deep, well drained soil is on lake terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 2 inches thick. The subsoil is brown clay loam about 10 inches thick. The upper 17 inches of the substratum is light brownish gray sandy loam; the next 17 inches is a pale brown, strongly cemented hardpan; and the lower part to a depth of 60 inches is pale brown sandy loam with varying degrees of cementation. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are Mellor soils on low terraces, Haybourne soils on inset alluvial fans, and Indian Creek soils on higher terrace remnants. The unit is about 5 percent Mellor soils, 5 percent Haybourne soils, and 5 percent Indian Creek soils.

Permeability of this Spasprey soil is moderately slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used for urban development and crops and as rangeland.

This soil is well suited to use as sites for the construction of dwellings. The main limitation to use of this unit as septic tank absorption fields is the hardpan. The suitability of the soil for use as septic tank absorption fields can be improved by ripping the hardpan.

The susceptibility of this soil to frost heaving is a moderate limitation to the use of this unit as sites for roads. Drainage should be provided.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and Douglas rabbitbrush. The production of forage is limited by the very low available water capacity, low precipitation, and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

If this unit is used for irrigated crops, the main limitations are the restricted depth of the root zone over the hardpan and the very low available water capacity. Under good management including a conservation cropping system, this soil can produce yields of 3 tons per acre of alfalfa, 42 bushels per acre of barley, or 62.5 bushels per acre of oats. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating. Overirrigating results in the formation of a perched water table.

The soils in this unit are in capability subclasses IIIs, irrigated, and VIs, nonirrigated.

1191—Spasprey sandy loam, 2 to 4 percent slopes. This moderately deep, well drained soil is on lake terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 2 inches thick. The subsoil is brown clay loam about 10 inches thick. The upper 17 inches of the substratum is light brownish gray sandy loam, the next 17 inches is a pale brown strongly cemented hardpan, and the lower part to a depth of 60 inches is pale brown sandy loam with varying degrees of cementation. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are Mellor soils on low terraces, Haybourne soils on inset alluvial fans, and Indian Creek soils on higher terrace remnants. The unit is about 5 percent Mellor soils, 5 percent Haybourne soils, and 5 percent Indian Creek soils.

Permeability of this Spasprey soil is moderately slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used for urban development and crops and as rangeland.

This soil is well suited to use as sites for dwellings. The main limitation to use of this unit as septic tank absorption fields is the hardpan. The suitability of the soil for use as septic tank absorption fields can be improved by ripping the hardpan.

The susceptibility of this soil to frost heaving is a moderate limitation to use of the unit as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and Douglas rabbitbrush. The production of forage is limited by the very low available water capacity, low precipitation, and the restricted depth of the root zone over the hardpan. This soil is rated as poorly suited to rangeland seeding, mainly because of the low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

If this unit is used for irrigated crops, the main limitations are the restricted depth of the root zone over the hardpan and the very low available water capacity. Under good management including a conservation cropping system, this soil can produce yields of 3 tons per acre of alfalfa, 42 bushels per acre of barley, or 62.5 bushels per acre of oats. Applications of irrigation water should be adjusted to the available water capacity, the water intake, and the crop needs to avoid overirrigating. Overirrigating results in the formation of a perched water table. Care must be taken to prevent erosion.

This soil is in capability subclasses IIIe, irrigated, and VIs, nonirrigated.

1192—Spasprey sand, 2 to 4 percent slopes. This moderately deep, well drained soil is on lake terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sand about 6 inches thick. The subsoil is brown clay loam about 8 inches thick. The upper 16 inches of the substratum is light brownish gray sandy loam, the next 17 inches is a pale brown strongly cemented hardpan, and the lower part to a depth of 60 inches is pale brown sandy loam with varying degrees of cementation. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are Mellor soils on low terraces, Haybourne soils on inset alluvial fans, and Indian Creek soils on higher terrace remnants. The unit is about 5 percent Mellor soils, 5 percent Haybourne soils, and 5 percent Indian Creek soils.

Permeability of this Spasprey soil is moderately slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used for urban development and crops and as rangeland.

This soil is well suited to use as sites for dwellings. The main limitation to use of this unit as septic tank absorption fields is the hardpan. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan.

The susceptibility of this soil to frost heaving is a moderate limitation to use of this unit as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and cheatgrass. The production of forage is limited by the low precipitation, very low available water capacity, and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

If this unit is used for irrigated crops, the main limitations are the restricted depth of the root zone over the hardpan and the very low available water capacity. Under good management including a conservation cropping system, this soil can produce yields of 2.5 tons per acre of alfalfa, 32 bushels per acre of barley, or 47 bushels per acre of oats. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid overirrigating. Overirrigating results in the formation of a perched water table.

This soil is in capability subclasses IVs, irrigated, and VIIs, nonirrigated.

1193—Spasprey sandy loam, 4 to 8 percent slopes. This moderately deep, well drained soil is on lake terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, the surface layer is grayish brown sandy loam about 2 inches thick. The subsoil is brown clay loam about 10 inches thick. The upper 17 inches of the substratum is light brownish gray sandy loam, the next 17 inches is a pale brown strongly cemented hardpan, and the lower part to a depth of 60 inches is pale brown sandy loam with varying degrees of cementation. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are Jowec Variant soils on lower terraces, Haybourne soils on inset alluvial fans, and Indian Creek soils on higher terrace remnants. The unit is about 5 percent Jowec Variant soils, 5 percent Haybourne soils, and 5 percent Indian Creek soils.

Permeability of this Spasprey soil is moderately slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used for urban development and as rangeland.

This soil is well suited to use as sites for dwellings. The main limitation to use of this unit as septic tank absorption fields is the hardpan. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan.

The susceptibility of this soil to frost heaving is a moderate limitation to use of this unit as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush and spiny hopsage. The production of forage is limited by the low precipitation, very low available water capacity, and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is poor because of the low precipitation, the very low available water capacity, and the restricted depth of the root zone over the hardpan. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclass VIs, nonirrigated.

1194—Spasprey stony sandy loam, 4 to 8 percent slopes. This moderately deep, well drained soil is on lake terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,500 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 3 inches thick. The subsoil is brown clay loam about 11 inches thick. The upper 9 inches of the substratum is light brownish gray sandy loam, the next 17 inches is a pale brown strongly cemented hardpan, and the lower part to a depth of 60 inches is pale brown sandy loam with varying degrees of cementation. Depth to the hardpan ranges from 20 to 30 inches.

Included in this unit are Incy soils on small sand dunes, Haybourne soils on inset alluvial fans, Indian Creek soils on higher terrace remnants, and Jowec Variant soils in shallow depressions. The unit is about 5 percent Incy soils, 3 percent Haybourne soils, 5 percent Indian Creek soils, and 2 percent Jowec Variant soils.

Permeability of this Spasprey soil is moderately slow. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used for urban development and as rangeland.

This soil is well suited to use as sites for the construction of dwellings. The main limitation to use of this unit as septic tank absorption fields is the hardpan. The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan.

The susceptibility of this soil to frost heaving is a moderate limitation to use of this soil as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, spiny hopsage, and Douglas rabbitbrush. A small amount of juniper is dispersed throughout. The production of forage is limited by the low precipitation, very low available water capacity, and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is poor, mainly because of the low precipitation, the very low available water capacity, and the restricted depth of the root zone over the hardpan. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIs, nonirrigated.

1200—Mellor silt loam. This very deep, moderately well drained soil is on lake terraces and alluvial fans. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,200 to 5,200 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is about 115 days.

Typically, the surface layer is pale brown silt loam about 11 inches thick. The subsoil is pale brown silty clay loam about 15 inches thick. The substratum to a depth of 60 inches is silty clay loam.

Included in this unit are Doten soils on lower terraces or in draws; Turria soils, which occur on alluvial fans and are subject to frequent flooding; Incy soils on small sand dunes; and Rednik soils on higher elevations near drainageways. The unit is about 5 percent Doten soils, 5 percent Turria soils, 3 percent Incy soils, and 2 percent Rednik soils.

Permeability of this Mellor soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The surface layer is moderately affected by salt and alkali, and the subsoil and substratum are strongly affected by salt and alkali.

This unit is used for urban development and as rangeland.

If this unit is used for urban development, the high clay content is a moderate limitation to construction of dwellings. The high clay content results in moderately high shrink-swell potential, which can cause structural damage to buildings. Damage can be prevented by properly designing foundations and footings and by diverting water away from the soil near buildings. The main limitation to use of this soil as septic tank absorption fields is the slowly permeable subsoil. This

limitation can be overcome by increasing the size of the absorption field.

The main limitation to use of this soil as sites for roads is the low load-bearing strength. Suitable material should be added to provide a stable base.

The present vegetation in most areas is mainly black greasewood and Douglas rabbitbrush. The production of forage is limited by salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of salinity and alkalinity. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

This soil is in capability subclass VIIs, nonirrigated.

1210—Linhart stony coarse sand, 4 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,500 to 6,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 120 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony coarse sand about 14 inches thick. The underlying material to a depth of 60 inches is grayish brown to light brownish gray stratified very gravelly coarse sand to very gravelly loamy coarse sand.

Included in this unit are Bedell soils on higher alluvial fans and Holbrook soils, which occur at lower elevations along drainageways and are subject to flooding for short periods in most years. The unit is about 8 percent Bedell soils and 7 percent Holbrook soils.

Permeability of this Linhart soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to occasional flash flooding during storms of high intensity, usually during summer.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings and as septic tank absorption fields. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. Rapid permeability is also a limitation to use of this soil as septic tank absorption fields. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage.

Flooding is a limitation to use of this soil as sites for roads. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because the available water capacity is very low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IVs, irrigated, and VIIs, nonirrigated.

1211—Linhart stony coarse sand, 15 to 30 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in alluvium derived dominantly from granitic rocks. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 46 to 49 degrees F, and the average frost-free period is 90 to 120 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony coarse sand about 14 inches thick. The underlying material to a depth of 60 inches is grayish brown to light brownish gray, stratified very gravelly coarse sand and very gravelly loamy coarse sand.

Included in this unit are Bedell soils on higher alluvial fans and Holbrook soils, which occur at lower elevations along drainageways and are subject to flooding for brief periods in most years. The unit is about 8 percent Bedell soils and 7 percent Holbrook soils.

Permeability of this Linhart soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland.

Flooding and steepness of slope are limitations to use of this unit as sites for construction of dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain.

The main limitations to use of this soil as septic tank absorption fields are rapid permeability and steepness of slope. Because the underlying material is rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. If the density of housing is too high, community sewage systems are needed to prevent contamination of water supplies as a result of

seepage. Care should be taken to prevent surfacing of the leachate downslope.

The main limitation to use of this soil as sites for roads is the steepness of slope. Roads should be provided with drainage. They should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly big sagebrush, Anderson peachbrush, and antelope bitterbrush. The production of forage is limited by moderately low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because the available water capacity is very low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclass VIIs, nonirrigated.

1220—Calpine coarse sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from granitic rocks. Elevation is 4,800 to 5,500 feet. The average annual precipitation is about 10 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 80 to 100 days.

Typically, the surface layer is dark grayish brown coarse sandy loam about 19 inches thick. The upper 26 inches of the underlying material is brown sandy loam. The lower part to a depth of 60 inches is light yellowish brown loamy fine sand.

Included in this unit are Mottsville soils on higher alluvial fans, Linhart soils along drainageways, and Oest soils on higher terrace remnants. The unit is about 5 percent Mottsville soils, 6 percent Linhart soils, and 4 percent Oest soils.

Permeability of this Calpine soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland. It can be used for irrigated crops if water is available.

The present vegetation in most areas is mainly big sagebrush, antelope bitterbrush, and Indian ricegrass. The production of forage is limited by moderately low precipitation. The suitability of this soil for rangeland seeding is poor, mainly because the available water capacity is very low.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. Clearing of brush would encourage the growth of desirable forage grasses.

Susceptibility of the soil to frost heaving is a moderate limitation to use of this soil as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

This soil is in capability subclasses IIIe, irrigated, and VIc, nonirrigated.

1240—Pizene sandy loam, 0 to 4 percent slopes. This very deep, well drained soil is on alluvial fans and outwash plains. It formed in alluvium derived from mixed rock sources. Elevation is 4,400 to 5,000 feet. The average annual precipitation is about 4 to 6 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is pale brown sandy loam about 6 inches thick. The subsoil is brown sandy clay loam about 15 inches thick. The substratum to a depth of 60 inches is sandy loam.

Included in this unit are Rednik soils on the upper parts of alluvial fans, Doten soils on lower flood plains, and Aladshi soils on slightly higher terrace remnants. The unit is about 5 percent Rednik soils, about 5 percent Doten soils, and 5 percent Aladshi soils.

Permeability of this Pizene soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is slightly affected by salt and alkali in the subsoil.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

This soil is well suited to use as sites for dwellings. This soil is well suited to use as septic tank absorption fields.

Roads can easily be constructed and maintained on this unit.

The present vegetation in most areas is mainly bud sagebrush and Douglas rabbitbrush. The production of forage is limited by low precipitation and salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of salinity and alkalinity and very low precipitation. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

This soil is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated.

1250—Rednik very gravelly sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,250 to 5,400 feet. The average annual precipitation is about 5 to 7 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is light brownish gray very gravelly sandy loam about 6 inches thick. The subsoil is brown very gravelly sandy clay loam about 14 inches thick. The substratum to a depth of 65 inches is very gravelly sandy loam and extremely gravelly loamy sand.

Included in this unit are Pizene soils on lower parts of alluvial fans, Bluewing soils along the higher parts of drainageways, and Aladshi soils on higher lying alluvial fans. The unit is about 5 percent Pizene soils, 5 percent Bluewing soils, and 5 percent Aladshi soils.

Permeability of this Rednik soil is moderately slow in the subsoil and very rapid in the substratum. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this soil as septic tank absorption fields is the very rapidly permeable substratum. Because the substratum is very rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies.

Flooding and stones are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface.

The present vegetation in most areas is mainly Indian ricegrass, bud sagebrush, and shadscale. The production of forage is limited by very low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and the very low precipitation. The duration and intensity of grazing should be adjusted to season of growth and precipitation.

This soil is in capability subclass VIIs, nonirrigated.

1251—Rednik very stony sandy loam, 8 to 15 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 4,250 to 5,400 feet. The average annual precipitation is about 5 to 7 inches, the average annual air temperature is 47 to 51 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is light brownish gray very stony sandy loam about 6 inches thick. The subsoil is brown very gravelly sandy clay loam about 14 inches thick. The substratum to a depth of 65 inches is very gravelly sandy loam and extremely gravelly loamy sand.

Included in this unit are Pizene soils on lower parts of alluvial fans, Bluewing soils along the higher parts of drainageways, and Kayo soils on higher-lying alluvial fans. The unit is about 5 percent Pizene soils, 5 percent Bluewing soils, and 5 percent Kayo soils.

Permeability of this Rednik soil is moderately slow in the subsoil and very rapid in the substratum. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitations to use of this unit as septic tank absorption fields are the very rapidly permeable substratum and steepness of slope. Because the substratum is very rapidly permeable, the leachate can run into the ground water or into nearby surface water before it is sufficiently purified. Absorption fields should be designed to avoid pollution of water supplies. Care should be taken to prevent surfacing of the leachate downslope.

Flooding, stones, and steepness of slope are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage and an adequate wearing surface. They should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The present vegetation in most areas is mainly Indian ricegrass, bud sagebrush, and shadscale. The production of forage is limited by very low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and the very low precipitation. The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

This soil is in capability subclass VIIs, nonirrigated.

1260—Thulepah-Mosquet association. This map unit is on uplands. Elevation is 7,000 to 8,300 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 41 to 44 degrees F, and the average frost-free period is less than 70 days.

This unit is 45 percent Thulepah very stony loam, 8 to 30 percent slopes, and 40 percent Mosquet very cobbly fine sandy loam, 4 to 30 percent slopes. The Thulepah soil is on rounded hilltops and plateaus, and the Mosquet soil is on mountain ridges.

Included in this unit are Softscrabble soils, which occur on lower concave side slopes; Rock outcrop, which

occurs as peaks and rims; and Ticino soils, which occur in snow pockets and support mountainmahogany. Also included are small areas of Gabica soils on south-facing ridges and wet areas that occur as seeps. The unit is about 4 percent Softscrabble soils, 3 percent Rock outcrop, 3 percent Ticino soils, 3 percent Gabica soils, and 2 percent wet areas.

The Thulepah soil is very deep and well drained. It formed in residuum and colluvium derived from basalt. Typically, 5 to 15 percent of the surface is covered with stones. The surface layer is dark brown very stony loam about 6 inches thick. The upper part of the subsoil, about 31 inches thick, is mainly dark brown and yellowish brown gravelly loam and gravelly clay loam that averages gravelly clay loam. The lower part to a depth of 60 inches or more is yellowish brown clay loam and silty clay loam.

Permeability of the Thulepah soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Mosquet soil is shallow and well drained. It formed in residuum derived dominantly from basalt. Typically, 35 to 60 percent of the surface is covered by rock fragments, mostly cobbles. The surface layer is grayish brown very cobbly fine sandy loam about 5 inches thick. The subsoil is dark brown gravelly clay and dark yellowish brown gravelly clay. Hard bedrock is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Mosquet soil is slow. Available water capacity is very low. Effective rooting depth is 6 to 20 inches. Runoff is medium, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Thulepah soil is mainly big sagebrush, bluebunch wheatgrass, and Idaho fescue. The production of forage is limited by the short growing season and the cold temperature in spring. The suitability of this soil for rangeland seeding is poor, mainly because of the large stones on the surface.

The present vegetation in most areas of the Mosquet soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the short growing season and the cold temperature in spring, the very low available water capacity, the high clay content, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity and the restricted depth of the root zone over bedrock. Cold soil temperatures delay plant growth and readiness for grazing. Grazing should be delayed until the soils are warm and the plants have achieved sufficient growth. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

The main limitations to use of the unit as sites for roads are steepness of slope of both soils and the high clay content and shallowness over bedrock of the Mosquet soil. Deep cuts should be avoided because of the shallowness of the Mosquet soil over bedrock. Roads should be provided with an adequate wearing surface and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1270—Tristan-Indiano-Lemm association. This map unit is on uplands. Elevation is 5,200 to 7,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 44 to 51 degrees F, and the average frost-free period is 80 to 110 days.

This unit is 30 percent Tristan very stony loam, 15 to 50 percent slopes; 30 percent Indiano gravelly loam, 30 to 50 percent slopes; and 25 percent Lemm very stony sandy loam, 15 to 30 percent slopes. The Tristan soil is on concave east- and north-facing slopes, the Indiano soil is on smooth side slopes, and the Lemm soil is on colluvial slopes and short alluvial fans.

Included in this unit are Old Camp soils on south-facing ridges, Duco soils near peaks and ridges at higher elevations, Frodo soils on small plateau remnants, and Rock outcrop on rims and peaks. The unit is about 5 percent Old Camp soils, 5 percent Duco soils, 3 percent Frodo soils, and 2 percent Rock outcrop.

The Tristan soil is deep and well drained. It formed in residuum and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony loam about 7 inches thick. The upper part of the subsoil is brown very gravelly clay loam about 21 inches thick. The lower part of the subsoil is brown extremely cobbly loam about 21 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Tristan soil is moderately slow. Available water capacity of the soil is low. Effective rooting depth is 40 to 60 inches. Runoff is medium to high, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Indiano soil is moderately deep and well drained. It formed in residuum derived dominantly from metavolcanic rocks. Typically, 15 to 30 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly loam about 13 inches thick. The subsoil is yellowish brown clay loam about 20 inches thick. Unweathered bedrock is at a depth of 33 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Indiano soil is moderately slow. Available water capacity of the soil is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the

hazard of water erosion is high. The hazard of soil blowing is slight.

The Lemm soil is very deep and well drained. It formed in alluvium mainly from granitic rocks. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 19 inches thick. The subsoil is pale brown very gravelly coarse sandy loam about 21 inches thick. The substratum is very pale brown very gravelly loamy coarse sand to a depth of 60 inches.

Permeability of the Lemm soil is moderately rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Tristan soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope, the large stones on the surface, and the very low available water capacity of the surface layer.

The present vegetation in most areas of the Indiano soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, moderate available water capacity of the soil, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope.

The present vegetation in most areas of the Lemm soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope and the stones of the Tristan soil. Roads should be provided with an adequate wearing surface and located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Indiano soil is in capability subclass VIIe, nonirrigated. The Tristan and Lemm soils are in capability subclass VIIs, nonirrigated.

1271—Tristan-Barshaad-Arzo association. This map unit is on uplands. Elevation is 5,200 to 7,000 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 44 to 51 degrees F, and the average frost-free period is 80 to 100 days.

This unit is 30 percent Tristan very stony loam, 15 to 50 percent slopes; 30 percent Barshaad very stony loam, 2 to 15 percent slopes; and 25 percent Arzo very stony loam, 8 to 30 percent slopes. The Tristan soil is on concave east- and north-facing slopes, the Barshaad soil is on relatively flat slopes of plateaus and tops, and the Arzo soil is on lower foot slopes.

Included in this unit are Softscrabble soils on concave north-facing slopes at higher elevations in snowpockets, Reywat soils near ridges and peaks, Risley soils on south-facing slopes, and Duco soils on ridges at higher elevations. The unit is about 5 percent Softscrabble soils, 5 percent Reywat soils, 3 percent Risley soils, and 2 percent Duco soils.

The Tristan soil is deep and well drained. It formed in residuum and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony loam about 7 inches thick. The upper part of the subsoil is brown very gravelly clay loam about 21 inches thick. The lower part of the subsoil is brown extremely cobbly loam about 21 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Tristan soil is moderately slow. Available water capacity of the soil is low. Effective rooting depth is 40 to 60 inches. Runoff is medium to high, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Barshaad soil is moderately deep and well drained. It formed in residuum derived dominantly from metavolcanic and metasedimentary rock. Typically, 3 to 15 percent of the surface is covered with stones and some cobbles. The surface layer is grayish brown very stony loam about 1 inch thick. The subsoil is brown gravelly clay about 23 inches thick. Weathered bedrock is at a depth of 24 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Barshaad soil is very slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Arzo soil is moderately deep and well drained. It formed in alluvium and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 25 inches thick. The substratum is yellowish brown

gravelly loam about 8 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Arzo soil is slow. Available water capacity of the soil is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Tristan soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope, the large stones on the surface, and the very low available water capacity of the surface layer.

The present vegetation in most areas of the Barshaad soil is mainly low sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, very low available water capacity, high clay content, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and the large stones on the surface.

The present vegetation in most areas of the Arzo soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, the low available water capacity of the soil, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor, mainly because of the large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this soil as sites for roads are the steepness of slope and stones of the Tristan soil; low load-bearing strength and high clay content of the Barshaad soil; and steepness of slope, low load-bearing strength, and high clay content of the Arzo soil. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1272—Tristan-Arzo-Reywat association. This map unit is on uplands. Elevation is 5,200 to 7,000 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 45 to 50 degrees F, and the average frost-free period is 80 to 110 days.

This unit is 45 percent Tristan very stony loam, 15 to 50 percent slopes; 25 percent Arzo very stony loam, 8 to 30 percent slopes; and 15 percent Reywat extremely stony loam, 15 to 50 percent slopes. The Tristan soil is on east- and north-facing slopes. The Arzo soil is on lower foot slopes and rounded ridges. The Reywat soil is on ridges and crests.

Included in this unit are Duco soils on peaks at higher elevations, Frodo soils on plateau remnants, Nosrac soils on colluvial slopes near drainageways, Softscrabble soils on concave north-facing slopes in snowpockets, and Rubbleland on rock screes. The unit is about 3 percent Duco soils, 3 percent Frodo soils, 3 percent Nosrac soils, 3 percent Softscrabble soils, and 3 percent Rubbleland.

The Tristan soil is deep and well drained. It formed in residuum and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony loam about 7 inches thick. The upper part of the subsoil is brown very gravelly clay loam about 21 inches thick. The lower part of the subsoil is brown extremely cobbly loam about 21 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Tristan soil is moderately slow. Available water capacity of the soil is low. Effective rooting depth is 40 to 60 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Arzo soil is moderately deep and well drained. It formed in alluvium and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 25 inches thick. The substratum is yellowish brown gravelly loam about 8 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Arzo soil is slow. Available water capacity of the soil is slow. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Reywat soil is shallow and well drained. It formed in residuum from basic igneous rocks. Typically, 15 to 50 percent of the surface is covered with stones. The surface layer is grayish brown extremely stony loam about 6 inches thick. The subsoil is brown very gravelly clay loam about 12 inches thick. Bedrock is at a depth of 18 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Reywat soil is moderately slow. Available water capacity of the soil is very low. Effective

rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Tristan soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope, large stones on the surface, and the very low available water capacity of the surface layer.

The present vegetation in most areas of the Arzo soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor, mainly because of the large stones on the surface.

The present vegetation in most areas of the Reywat soil is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by the very low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, steepness of slope, large stones on the surface, and the restricted depth of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this soil as sites for roads are the steepness of slope and stones of the Tristan soil; low load-bearing strength, high clay content, and steepness of slope of the Arzo soil; and shallowness over bedrock and steepness of slope of the Reywat soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling, and to reduce erosion. Suitable material should be added to provide a stable base and an adequate wearing surface. Deep cuts in the Reywat soil should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1273—Tristan-Barshaad-Frodo association. This map unit is on uplands. Elevation is 5,200 to 7,000 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 44 to 51 degrees F, and the average frost-free period is 80 to 110 days.

This unit is 30 percent Tristan very stony loam, 15 to 50 percent slopes; 30 percent Barshaad very stony sandy loam, 2 to 15 percent slopes; and 25 percent Frodo very stony loam, 8 to 30 percent slopes. The Tristan soil is on north- and east-facing slopes. The Barshaad soil is on plateaus. The Frodo soil is on pediments, rounded ridges, and tilted plateaus.

Included in this unit are Oppio soils on south- and west-facing slopes, Reywat soils near ridges and peaks, Nosrac soils on lower colluvial slopes near drainageways, and Rock outcrop as ridges and peaks. The unit is about 7 percent Oppio soils, 3 percent Reywat soils, about 3 percent Nosrac soils, and 2 percent Rock outcrop.

The Tristan soil is deep and well drained. It formed in residuum and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony loam about 7 inches thick. The upper part of the subsoil is brown very gravelly clay loam about 21 inches thick. The lower part of the subsoil is brown extremely cobbly loam about 21 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Tristan soil is moderately slow. Available water capacity of the soil is low. Effective rooting depth is 40 to 60 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Barshaad soil is moderately deep and well drained. It formed in residuum derived dominantly from metavolcanic and metasedimentary rock. Typically, 3 to 15 percent of the surface is covered with stones and some cobbles. The surface layer is grayish brown very stony loam about 1 inch thick. The subsoil is brown gravelly clay about 23 inches thick. Weathered bedrock is at a depth of 24 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Barshaad soil is very slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Frodo soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from basalt. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony loam about 6 inches thick. The subsoil is brown clay about 12 inches thick. A continuous strongly cemented hardpan is at a depth of 18 inches. Depth to the hardpan ranges from 14 to 20 inches. The pan is underlain by hard bedrock.

Permeability of the Frodo soil is slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Tristan soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope, the large stones on the surface, and the very low available water capacity of the surface layer.

The present vegetation in most areas of the Barshaad soil is mainly low sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation, very low available water capacity, high clay content, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, the abrupt textural boundary, and large stones on the surface.

The present vegetation in most areas of the Frodo soil is mainly low sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, the shallowness of the root zone over the hardpan, and the large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this soil as sites for roads are the steepness of slope and stones of the Tristan soil; low load-bearing strength and high shrink-swell potential of the Barshaad soil; and depth to bedrock, low load-bearing strength, and steepness of slope of the Frodo soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Suitable material should be added to provide a stable base and an adequate wearing surface. Deep cuts should be avoided in the Frodo soil because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1290—Parran silty clay loam, rarely flooded. This very deep, poorly drained soil is in basins and on low lake terraces. It formed in alluvium and lacustrine deposits derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,000 to 4,200 feet. The average annual precipitation is about 4 to 6 inches, the average annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is light brownish gray silty clay loam about 5 inches thick. The underlying material to a depth of 60 inches is light brownish gray and light olive gray silty clay.

Included in this unit are Doten soils on higher parts of flood plains, Dalzell soils on higher terrace remnants, Pizene soils on higher alluvial fans, and wet areas that occur as seeps. The unit is about 5 percent Doten soils, 5 percent Dalzell soils, 3 percent Pizene soils, and 2 percent wet areas.

Permeability of this Parran soil is very slow. The available water capacity is high if the salt is removed. Effective rooting depth is more than 60 inches if the content and water table are lowered. Runoff is ponded, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is very strongly salt- and alkali-affected. It has a water table at a depth of 24 to 36 during winter and spring. It is subject to shallow flooding during storms of prolonged high intensity.

This unit is used as rangeland.

The present vegetation in most areas is mainly saltgrass and black greasewood. The production of forage is limited by very low precipitation and salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of the salinity and alkalinity and very low precipitation. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

The main limitations to use of this soil as sites for roads are the susceptibility of the soil to frost heaving, the low load-bearing strength, and the high clay content. Roads should be provided with drainage. Suitable material should be added to provide a stable base and an adequate wearing surface.

This soil is in capability subclass VIIw, nonirrigated.

1300—Rose Creek Variant sandy loam. This very deep, moderately well drained soil is on lake terraces and flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,000 to 4,400 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray sandy loam about 5 inches thick. The subsoil is light brownish gray very fine sandy loam about 7 inches thick. The substratum to a depth of 60 inches is stratified gravelly loamy sand to loam.

Included in this unit are Pizene soils on higher terrace remnants, Mottsville soils on higher alluvial fans, and Doten soils in shallow depressions. The unit is about 5

percent Pizene soils, 5 percent Mottsville soils, and 5 percent Doten soils.

Permeability of this Rose Creek Variant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The seasonal high water table is at a depth of 60 to 72 inches in spring. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this soil as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this soil as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

The use of this soil as sites for roads is moderately limited by flooding and the susceptibility of the soil to frost heaving. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, big saltbush, and basin wildrye. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIc, irrigated, and VIc, nonirrigated.

1301—Rose Creek Variant loamy fine sand. This very deep, moderately well drained soil is on lake terraces and flood plains. It formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent. Elevation is 4,000 to 4,400 feet. The average annual precipitation is about 8 to 10 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is about 100 days.

Typically, the surface layer is light brownish gray loamy fine sand about 5 inches thick. The subsoil is light brownish gray very fine sandy loam about 7 inches thick. The substratum to a depth of 60 inches is stratified gravelly loamy sand to loam.

Included in this unit are Pizene soils on higher terrace remnants, Mottsville soils on higher alluvial fans, and Doten soils in shallow depressions. The unit is about 5 percent Pizene soils, 5 percent Mottsville soils, and 5 percent Doten soils.

Permeability of this Rose Creek Variant soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. The seasonal high water table is at a depth of 60 to 72 inches in spring. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used for urban development and as rangeland. It can be used for irrigated crops if water is available.

Flooding is a limitation to use of this unit as sites for dwellings. Flash floods can occur on this soil during storms of unusually high intensity. Structures for protection from such floods are difficult to establish and maintain. The main limitation to use of this unit as septic tank absorption fields is the moderately slowly permeable subsoil. This limitation can be overcome by increasing the size of the absorption field.

The main limitations to use of this unit as sites for roads are flooding and the susceptibility of the soil to frost heaving. Roads should be provided with drainage.

The present vegetation in most areas is mainly big sagebrush, big saltbrush, and basin wildrye. The production of forage is limited by low precipitation. This soil is rated as poorly suited to rangeland seeding, mainly because precipitation is low. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Clearing of brush would encourage the growth of desirable forage grasses.

This soil is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated.

1310—Bango gravelly sandy loam, 0 to 8 percent slopes. This very deep, well drained soil is on lake terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,000 to 4,200 feet. The average annual precipitation is about 4 to 6 inches, the average annual air temperature is 51 to 53 degrees F, and the average frost-free period is about 130 days.

Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is light brownish gray gravelly sandy loam about 2 inches thick. The subsoil is pale brown loam about 8 inches thick. The substratum to a depth of 60 inches is stratified gravelly fine sandy loam to silt loam.

Included in this unit are Stumble soils on higher alluvial fans, Isolde soils on sand dunes, Bundorf soils on higher terrace remnants, and Ruhe soils on lower terraces near tufa outcrops. This unit is about 5 percent Stumble soils, 5 percent Isolde soils, 3 percent Bundorf soils, and 2 percent Ruhe soils.

Permeability of this Bango soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is slightly salt- and alkali-affected.

This unit is used as rangeland.

The present vegetation in most areas is mainly Bailey greasewood, shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by very low precipitation and salinity and alkalinity. The suitability of this soil for rangeland seeding is very poor, mainly because of very low precipitation and salinity and alkalinity. Grazing should be adjusted to season of growth and precipitation.

The high clay content of this soil is a moderate limitation to use of the unit as sites for roads. Roads should be provided with an adequate wearing surface.

This soil is in capability subclass VIIs, nonirrigated.

1320—Osobb-Rezave-Fireball association. This map unit is on uplands. Elevation is 4,400 to 7,000 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F., and the average frost-free period is 90 to 100 days.

This unit is 35 percent Osobb extremely stony fine sandy loam, 30 to 50 percent slopes; 25 percent Rezave extremely stony very fine sandy loam, 0 to 15 percent slopes; and 25 percent Fireball extremely stony fine sandy loam, 30 to 50 percent slopes. The Osobb soil occurs on smooth and slightly convex side slopes. The Rezave soil occurs on plateau tops. The Fireball soil occurs on colluvial, slightly concave side slopes.

Included in this unit are Pirouette soils on smooth slopes and plateaus near Rock outcrop, Flex soils at higher elevations on east- and north-facing slopes, and Rock outcrop as small peaks and rims. The unit is about 5 percent Pirouette soils, 5 percent Flex soils, and 5 percent Rock outcrop.

The Osobb soil is shallow and well drained. It formed in residuum of volcanic rocks. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is light brownish gray extremely stony fine sandy loam about 2 inches thick. The subsoil is pale brown very gravelly loam about 9 inches thick. The substratum is a very pale brown indurated hardpan about 2 inches thick over fractured bedrock. Depth to the hardpan ranges from 8 to 20 inches.

Permeability of the Osobb soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Rezave soil is shallow and well drained. It formed in residuum derived dominantly from basalt. Typically, 15 to 50 percent of the surface is covered with stones. The surface layer is light brownish gray extremely stony very fine sandy loam about 4 inches thick. The subsoil is light yellowish brown stony clay about 9 inches thick. The substratum to a depth of 19 inches or more is yellow, weakly silica-cemented gravelly clay loam. Hard basalt bedrock is at a depth of 19 inches. Depth to bedrock ranges from 14 to 20 inches.

Permeability of the Rezave soil is slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Fireball soil is deep and well drained. It formed in residuum derived dominantly from basalt. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is light brownish gray extremely stony fine sandy loam about 3 inches thick. The subsoil is light yellowish brown very cobbly loam about 21 inches thick. The substratum to a depth of 47 inches or more is white extremely cobbly loam. Hard basalt bedrock is at a depth of 47 inches. Depth to bedrock ranges from 40 to 60 inches.

Permeability of the Fireball soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Osobb soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, the very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, the very low available water capacity of the surface layer, the large stones on the surface, the steepness of slope, and the shallow root zone.

The present vegetation in most areas of the Rezave soil is mainly Bailey greasewood, spiny hopsage, and Indian ricegrass. The production of forage is limited by the very low precipitation, the shallowness of the root zone over bedrock, and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, the shallowness of the root zone, and the very low available water capacity of the surface layer.

The present vegetation in most areas of the Fireball soil is mainly Bailey greasewood, shadscale, and bud sagebrush. The production of forage is limited by the very low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, the steepness of slope, and the large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this soil as sites for roads are the shallowness over bedrock, steepness of slope, and stones of the Osobb soil, shallowness of the Rezave soil, and steepness of slope of the Fireball soil. Deep cuts should be avoided because of the underlying bedrock. Roads should be provided with an adequate wearing surface and located in less sloping areas, if

feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1330—Sutcliff-Kleinbush-Washoe association. This map unit is on dissected alluvial fans. Elevation is 4,400 to 5,000 feet. The average annual precipitation is 5 to 8 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 45 percent Sutcliff very stony loam, 4 to 15 percent slopes; 20 percent Kleinbush very cobbly loamy sand, 0 to 8 percent slopes; and 20 percent Washoe extremely stony fine sandy loam, 4 to 15 percent slopes. The Sutcliff soil is on the lower alluvial fan remnants and the side slopes of the dissection. The Kleinbush soil is on the higher alluvial fan remnants. The Washoe soil is along the drainageways.

Included in this unit are Rezave soils on upland hill remnants, Bundorf soils on slightly concave areas on the higher lying alluvial fan remnants, and Reno soils on north- and east-facing slopes at higher elevations. The unit is about 5 percent Rezave soils, 5 percent Bundorf soils, and 5 percent Reno soils.

The Sutcliff soil is deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is pale brown very stony loam about 5 inches thick. The subsoil is light yellowish brown very stony clay loam about 20 inches thick. The substratum is pinkish gray very cobbly loam about 17 inches thick over a strongly silica-cemented hardpan. Depth to the hardpan ranges from 40 to 60 inches.

Permeability of the Sutcliff soil is moderately slow. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Kleinbush soil is very deep and well drained. It formed in alluvium derived dominantly from basalt. Typically, 5 to 15 percent of the surface is covered with cobbles. The surface layer is light gray very cobbly loamy sand about 4 inches thick. The subsurface layer is light gray very fine sandy loam about 1 inch thick. The subsoil is light brown clay about 33 inches thick. The substratum to a depth of 60 inches or more is light gray cobbly sandy clay loam.

Permeability of the Kleinbush soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Washoe soil is very deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, 15 to 50 percent of the surface is covered with stones. The surface layer is brown extremely stony fine sandy loam about 11 inches thick. The subsoil is brown very gravelly sandy clay loam about 31 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown, stratified gravelly loamy coarse sand and very cobbly loamy coarse sand.

Permeability of the Washoe soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Sutcliff soil is mainly Bailey greasewood, bud sagebrush, and Indian ricegrass. The production of forage is limited by very low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the large stones on the surface.

The present vegetation in most areas of the Kleinbush soil is mainly shadscale, bud sagebrush, and Indian ricegrass. The production of forage is limited by the very low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the large stones on the surface.

The present vegetation in most areas of the Washoe soil is mainly big sagebrush. The production of forage is limited by low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the large stones on the surface and the very low available water capacity of the surface layer.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this unit as sites for roads are the low load-bearing strength of the Sutcliff soil and Kleinbush soil and steepness of slope, susceptibility to frost heaving, and high clay content of the Washoe soil. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface and a stable base.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1331—Sutcliff-Bundorf-Kleinbush association. This map unit is on dissected alluvial fans. Elevation is 4,400 to 7,400 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 35 percent Sutcliff very stony loam, 4 to 15 percent slopes; 35 percent Bundorf very stony loam, 4 to 15 percent slopes; and 15 percent Kleinbush very cobbly loamy sand, 0 to 8 percent slopes. The Sutcliff soil is on lower lying alluvial fans. The Bundorf soil is on higher lying alluvial fan remnants. The Kleinbush soil is on the toe slopes of the higher lying alluvial fans.

Included in this unit are Washoe soils along drainageways, Bluewing soils near mouths of canyons and in drainageways, and Stumble soils on alluvial fan skirts. The unit is about 5 percent Washoe soils, 5 percent Bluewing soils, and 5 percent Stumble soils.

The Sutcliff soil is deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is pale brown very stony loam about 5 inches thick. The subsoil is light yellowish brown very stony clay loam about 20 inches thick. The substratum is pinkish gray very cobbly loam about 17 inches thick over a strongly silica-cemented hardpan. Depth to the hardpan ranges from 40 to 60 inches.

Permeability of the Sutcliff soil is moderately slow. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Bundorf soil is shallow and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is light gray very stony loam about 2 inches thick. The upper part of the subsoil is pale brown clay about 8 inches thick. The lower part of the subsoil is light brown very cobbly clay loam about 4 inches thick. The substratum is light yellowish brown, very cobbly loam about 5 inches thick over an indurated hardpan. Depth to the hardpan ranges from 14 to 20 inches.

Permeability of the Bundorf soil is slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Kleinbush soil is very deep and well drained. It formed in alluvium derived dominantly from basalt. Typically, 5 to 15 percent of the surface is covered with cobbles. The surface layer is light gray very cobbly loamy sand about 4 inches thick. The subsurface layer is light gray very fine sandy loam about 1 inch thick. The subsoil is light brown clay about 33 inches thick. The substratum to a depth of 60 inches or more is light gray cobbly sandy clay loam.

Permeability of the Kleinbush soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Sutcliff soil is mainly Bailey greasewood, bud sagebrush, and Indian ricegrass. The production of forage is limited by the very low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the large stones on the surface.

The present vegetation in most areas of the Bundorf soil is mainly shadscale, bud sagebrush, and Indian ricegrass. The production of forage is limited by the very low precipitation, very low available water capacity, and the shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the shallowness of the root zone.

The present vegetation in most areas of the Kleinbush soil is mainly shadscale, bud sagebrush, and Indian ricegrass. The production of forage is limited by very low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, and the large stones on the surface.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this unit as sites for roads are the low load-bearing strength of the Sutcliff soil, the hardpan and high clay content of the Bundorf soil, and the low load-bearing strength of the Kleinbush soil. Suitable material should be added to provide a stable base and an adequate wearing surface. Deep cuts should be avoided because of the underlying hardpan of the Bundorf soil.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1340—Hawsley-Ruhe-Bluewing association. This map unit is on alluvial fans, terraces, and flood plains. Elevation is 4,000 to 4,400 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 110 to 130 days.

This unit is 50 percent Hawsley sand, 2 to 8 percent slopes; 20 percent Ruhe gravelly loamy sand, 0 to 8 percent slopes; and 15 percent Bluewing very stony loamy sand, 4 to 15 percent slopes. The Hawsley soil is on alluvial fans. The Ruhe soil is on tufa-controlled terraces. The Bluewing soil is on flood plains and in drainageways.

Included in this unit are Toulon soils on shoreline terraces, Trocken soils on lower alluvial fans, and tufa Rock outcrop as peaks. The unit is about 6 percent Toulon soils, 5 percent Trocken soils, and 4 percent Rock outcrop.

The Hawsley soil is very deep and somewhat excessively drained. It formed in water-reworked eolian sands derived from mixed rock sources. Slope is 2 to 8 percent. Typically, the surface layer is pale brown sand about 8 inches thick. The underlying material to a depth of 60 inches or more is pale brown, stratified fine sand to coarse sand.

Permeability of the Hawsley soil is very rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Ruhe soil is shallow and well drained. It formed in sandy alluvium derived from mixed rock sources. Typically, 15 to 35 percent of the surface is covered with

gravel. The surface layer is pale brown gravelly loamy sand about 14 inches thick. Lithoid tufa is at a depth of 14 inches and is about 21 inches thick. The underlying material to a depth of 60 inches is light brownish gray very cobbly coarse sand. Depth to lithoid tufa ranges from 14 to 20 inches.

Permeability of the Ruhe soil is rapid. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Bluewing soil is very deep and excessively drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light brownish gray very stony loamy sand about 9 inches thick. The underlying material to a depth of 60 inches or more is pale brown stratified very gravelly loamy coarse sand and very gravelly sand.

Permeability of the Bluewing soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to occasional flash flooding during storms of high-intensity, which usually occur in summer. Channeling and deposition are common along streambanks.

This unit is used as rangeland.

The present vegetation in most areas of the Hawsley soil is mainly Bailey greasewood, spiny hopsage, and Indian ricegrass. The production of forage is limited by the very low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the very low available water capacity.

The present vegetation in most areas of the Ruhe soil is mainly winterfat, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, the shallowness of the root zone over bedrock, and the very low available water capacity. The suitability of this soil for rangeland seeding is very poor. The main limitations for seeding are the very low precipitation, the very low available water capacity of the surface layer, and the shallowness of the root zone.

The present vegetation in most areas of the Bluewing soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation and the very low available water capacity of the surface layer.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of these soils as sites for roads are the shallowness over rock of the Ruhe soil and flooding on the Bluewing soil. Roads should be located in areas of the Hawsley soil if feasible.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1341—Isolde-Dune land complex, hilly. This map unit is on sand dunes superimposed over terraces and alluvial fans. Elevation is 4,000 to 5,000 feet. The average annual precipitation is 4 to 6 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 110 to 130 days.

This unit is 45 percent Isolde fine sand, 0 to 15 percent slopes, and 40 percent Dune land, 4 to 30 percent slopes. The Isolde soil is on stabilized sand dunes. The Dune land is on unstabilized, drifting sand dunes. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Bluewing soils in drainageways, Ruhe soils near outcrops of tufa, tufa Rock outcrop, and Playas on the bottom of windswept troughs. The unit is about 4 percent Bluewing soils, 4 percent Ruhe soils, 4 percent Rock outcrop, and 3 percent Playas.

The Isolde soil is very deep and excessively drained. It formed in wind-deposited sands derived from mixed rock sources. Slopes are 0 to 15 percent. Typically, the surface layer is light brownish gray fine sand about 6 inches thick. The underlying material to a depth of 60 inches is light gray fine sand.

Permeability of the Isolde soil is very rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Dune land is windblown sand deposited above the Isolde soil. It is susceptible to wind erosion.

This unit is used as rangeland.

The present vegetation in most areas of the Isolde soil is mainly spiny hopsage, hairy horsebrush, and Indian ricegrass. The production of forage is limited by very low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation and the very low available water capacity of the surface layer.

The intensity and duration of grazing should be adjusted to season of growth and to precipitation. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

Roads can easily be constructed and maintained on this unit.

This soil is in capability subclass VIIs, nonirrigated.

1342—Isolde-Playas association. This map unit is on sand dunes over superimposed lake terraces and basins. Elevation is 3,900 to 5,000 feet. The average annual precipitation is 4 to 6 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 110 to 130 days.

This unit is 70 percent Isolde fine sand, 0 to 15 percent slopes, and 15 percent Playas. The Isolde soil is on sand dunes, and Playas are in the basins.

Included in this unit are Toulon soils on higher shoreline terraces and Bluewing soils on alluvial fans. The unit is about 8 percent Toulon soils and 7 percent Bluewing soils.

The Isolde soil is very deep and excessively drained. It formed in wind-deposited sands derived from mixed rock sources. Slopes are 0 to 15 percent. Typically, the surface layer is light brownish gray fine sand about 6 inches thick. The underlying material to a depth of 60 inches is light gray fine sand.

Permeability of the Isolde soil is very rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used as rangeland.

The present vegetation in most areas of the Isolde soil is mainly spiny hopsage, hairy horsebrush, and Indian ricegrass. The production of forage is limited by very low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation and the very low available water capacity of the surface layer.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

Roads should be located in areas of the Isolde soil, if feasible.

The Isolde soil is in capability subclass VIIs, nonirrigated.

1344—Isolde-Toulon complex, 0 to 15 percent slopes. This map unit is on lake terraces and on sand dunes over terraces. Elevation is 3,800 to 4,300 feet. The average annual precipitation is 4 to 6 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 110 to 130 days.

This unit is 55 percent Isolde fine sand, 0 to 15 percent slopes, and 30 percent Toulon very gravelly loam, 2 to 8 percent slopes. The Isolde soil is on sand dunes. The Toulon soil is on remnant lake bars and shoreline terraces. Areas of these soils are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Stumble soils on alluvial fans, Bluewing soils near drainageways and on upper parts of alluvial fans, and Playas in shallow windswept depressions. The unit is about 5 percent Stumble soils, 6 percent Bluewing soils, and 4 percent Playas.

The Isolde soil is very deep and excessively drained. It formed in wind-deposited sands derived from mixed rock sources. Slopes are 0 to 15 percent. Typically, the surface layer is light brownish gray fine sand about 6 inches thick. The underlying material to a depth of 60 inches is light gray fine sand.

Permeability of the Isolde soil is very rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Toulon soil is very deep and excessively drained. It formed in alluvium derived from mixed rock sources. Typically, 45 to 60 percent of the surface is covered with gravel. The surface layer is pale brown very gravelly loam about 6 inches thick. The subsoil is very gravelly sandy loam about 7 inches thick. The substratum to a depth of 60 inches or more is stratified very gravelly coarse sand to very cobbly coarse sand.

Permeability of the Toulon soil is moderately rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Isolde soil is mainly spiny hopsage, hairy horsebrush, and Indian ricegrass. The production of forage is limited by very low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the very low available water capacity of the surface layer.

The present vegetation in most areas of the Toulon soil is mainly Bailey greasewood, shadscale, and bud sagebrush. The production of forage is limited by the very low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because precipitation is very low.

The intensity and duration of grazing should be adjusted to season of growth and to precipitation. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

Stones are a limitation to use of the Toulon soil as sites for roads. Roads should be located in areas of the Isolde soil if feasible.

The soils in this unit are capability subclass VIIs, nonirrigated.

1345—Hawsley sand, 2 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans. It formed in water-reworked eolian deposits derived from mixed rock sources. Elevation is 3,900 to 4,400 feet. The average annual precipitation is about 4 to 7 inches, the average annual air temperature is 46 to 50 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is pale brown sand about 8 inches thick. The underlying material to a depth of 60 inches is pale brown, stratified fine sand through coarse sand.

Included in this unit are Bluewing soils near the mouths of canyons and along drainageways, Trocken soils on slightly higher alluvial fan remnants, and Ruhe soils on small remnants of tufa-controlled terraces. The unit is about 5 percent Bluewing soils, 5 percent Trocken soils, and 5 percent Ruhe soils.

Permeability of this Hawsley soil is very rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used as rangeland.

The present vegetation in most areas is mainly Bailey greasewood, spiny hopsage, and Indian ricegrass. The production of forage is limited by very low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor, mainly because of very low precipitation and the very low available water capacity of the surface layer.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

Roads can easily be constructed and maintained on this unit.

This soil is in capability subclass VIIs, nonirrigated.

1350—Stumble-Ruhe-Bluewing association. This map unit is on alluvial fans and terraces. Elevation is 4,000 to 4,400 feet. The average annual precipitation is 4 to 6 inches, the average annual air temperature is 50 to 52 degrees F, and the average frost-free period is 110 to 130 days.

This unit is 40 percent Stumble loamy sand, 4 to 15 percent slopes; 30 percent Ruhe gravelly loamy sand, 2 to 8 percent slopes; and 15 percent Bluewing very stony loamy sand, 4 to 8 percent slopes. The Stumble soil is on alluvial fans. The Ruhe soil is on tufa-controlled terraces. The Bluewing soil is on upper parts of alluvial fans and on flood plains.

Included in this unit are Isolde soils on sand dunes and tufa Rock outcrop as peaks and rims. The unit is about 9 percent Isolde soils and 6 percent Rock outcrop.

The Stumble soil is very deep and somewhat excessively drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is pale brown loamy sand about 2 inches thick. The upper 22 inches of underlying material is pale brown loamy sand. The next part to a depth of 43 inches is light brownish gray gravelly loamy sand and loamy sand. Below this to a depth of 60 inches is stratified gravel and very gravelly sand.

Permeability of the Stumble soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Ruhe soil is shallow and well drained. It formed in alluvium derived from mixed rock sources. Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is pale brown gravelly loamy sand about 14 inches thick. Lithoid tufa is at a depth of 14 inches and is about 21 inches thick. The underlying material to a depth of 60 inches is light brownish gray very cobbly coarse sand. Depth to lithoid tufa ranges from 14 to 20 inches.

Permeability of the Ruhe soil is rapid. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Bluewing soil is very deep and excessively drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light brownish gray very stony loamy sand about 9 inches thick. The underlying material to a depth of 60 inches or more is pale brown stratified very gravelly loamy coarse sand and very gravelly sand.

Permeability of the Bluewing soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to occasional flash flooding during storms of high intensity, which usually occur in summer. Channeling and deposition are common along streambanks.

This unit is used as rangeland.

The present vegetation in most areas of the Stumble soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and very low precipitation.

The present vegetation in most areas of the Ruhe soil is mainly winterfat, shadscale, and Indian ricegrass. The production of forage is limited by very low precipitation, the shallowness of the root zone over bedrock, and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, the very low available water capacity of the surface layer, and the shallowness of the root zone.

The present vegetation in most areas of the Bluewing soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the very low available water capacity of the surface layer.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this soil as sites for roads are depth to rock of the Ruhe soil, flooding on the Bluewing soil, and steepness of slope of the Stumble soil. Roads should be provided with drainage and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1351—Stumble loamy sand, 4 to 8 percent slopes. This very deep, somewhat excessively drained soil is on alluvial fans and terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,000 to 4,500 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is about 130 days.

Typically, the surface layer is dark brown loamy sand about 6 inches thick. The upper 23 inches of the underlying material is pale brown loamy sand. The lower part to a depth of 50 inches is light brownish gray gravelly loamy sand.

Included in this unit are Isolde soils on sand dunes, Ruhe soils on tufa-controlled terraces, Trocken soils near channels on alluvial fans, and Bluewing soils in drainageways. The unit is about 4 percent Isolde soils, 3 percent Ruhe soils, 4 percent Trocken soils, and 4 percent Bluewing soils.

Permeability of the Stumble soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used as rangeland.

The present vegetation in most areas is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer and very low precipitation.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

Roads can be easily constructed and maintained on this unit.

This soil is in capability subclass VIIs, nonirrigated.

1360—Trocken-Stumble-Bluewing association. This map unit is on alluvial fans. Elevation is 4,000 to 5,000 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 130 days.

This unit is 45 percent Trocken very stony sandy loam, 4 to 15 percent slopes; 20 percent Stumble loamy sand, 4 to 15 percent slopes; and 20 percent Bluewing very stony loamy sand, 4 to 15 percent slopes. The Trocken soil is on alluvial fans. The Stumble soil is on alluvial fan skirts. The Bluewing soil is in drainageways of alluvial fans.

Included in this unit are Isolde soils on sand dunes and Ruhe soils on tufa-controlled terraces. The unit is about 9 percent Isolde soils and 6 percent Ruhe soils.

The Trocken soil is very deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 3 inches thick. The subsoil is brown gravelly sandy loam about 8 inches thick. The substratum to a depth of 60 inches or more is brown, stratified extremely gravelly loamy coarse sand to very cobbly loam.

Permeability of the Trocken soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

The Stumble soil is very deep and somewhat excessively drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is dark brown loamy sand about 2 inches thick. The upper 22 inches of the underlying material is pale brown loamy sand. The lower part to a depth of 60 inches is light brownish gray gravelly loamy sand.

Permeability of the Stumble soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Bluewing soil is very deep and excessively drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light brownish gray very stony loamy sand about 9 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified very gravelly loamy coarse sand to extremely gravelly sand.

Permeability of the Bluewing soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to occasional flash flooding during storms of high intensity, usually in summer.

This unit is used as rangeland.

The present vegetation in most areas of the Trocken soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by very low precipitation and low available water capacity. This soil is rated as very poorly suited to rangeland seeding, mainly because precipitation is very low.

The present vegetation in most areas of the Stumble soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation.

The present vegetation in most areas of the Bluewing soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of very low precipitation and the very low available water capacity of the surface layer.

The duration and intensity of grazing should be adjusted to season of growth and precipitation. To insure unform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

The main limitations to use of this soil as sites for roads are flooding and steepness of slope of the Trocken soil, flooding on the Bluewing soil, and steepness of slope of the Stumble soil. Roads should be provided with drainage and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1361—Trocken-Ruhe-Bluewing association. This map unit is on alluvial fans and terraces. Elevation is 4,000 to 4,400 feet. The average annual precipitation is 4 to 6 inches, the average annual air temperature is 48 to 50 degrees F, and the average annual frost-free period is 90 to 110 days.

This unit is 35 percent Trocken very stony sandy loam, 4 to 15 percent slopes; 35 percent Ruhe very stony loamy sand, 4 to 15 percent slopes; and 15 percent Bluewing very stony loamy sand, 4 to 15 percent slopes. The Trocken soil is on alluvial fans. The Ruhe soil is on tufa-controlled terraces. The Bluewing soil is on alluvial fans near the mouths of canyons and along drainageways.

Included in this unit are Isolde soils on sand dunes and Stumble soils on alluvial fan skirts. The unit is about 8 percent Isolde soils and 7 percent Stumble soils.

The Trocken soil is very deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is brown, stratified extremely gravelly loamy coarse sand to very cobbly loam.

Permeability of the Trocken soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

The Ruhe soil is shallow and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony loamy sand about 6 inches thick. The subsoil is light brownish gray gravelly loamy sand 8 inches thick. Below that is lithoid tufa about 14 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified very cobbly coarse sand to sand. Depth to lithoid tufa ranges from 14 to 20 inches.

Permeability of the Ruhe soil is rapid. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Bluewing soil is very deep and excessively drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light brownish gray very stony loamy sand about 9 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified very gravelly loamy coarse sand to extremely gravelly sand.

Permeability of the Bluewing soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to occasional flash flooding during storms of high intensity.

This unit is used as rangeland.

The present vegetation in most areas of the Trocken soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by very low precipitation and low available water capacity. This soil is rated as very poorly suited to rangeland seeding, mainly because precipitation is very low.

The present vegetation in most areas of the Ruhe soil is mainly winterfat, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, the shallowness of the root zone over bedrock, and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, the very low available water capacity of the surface layer, and the shallowness of the root zone.

The present vegetation in most areas of the Bluewing soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the very low available water capacity of the surface layer.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation. To insure uniform grazing, salt blocks should be placed in

less accessible areas rather than near water or in easily accessible areas.

The main limitations to use of this soil as sites for roads are susceptibility to flooding of the Trocken and Bluewing soils, steepness of slope of the Trocken and Ruhe soils, and the shallowness over rock of the Ruhe soil. Roads should be provided with drainage and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1362—Trocken-Badland complex, 4 to 15 percent slopes. This map unit is on alluvial fans and terraces. Elevation is 3,900 to 4,400 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 120 days.

This unit is 55 percent Trocken very stony sandy loam, 4 to 15 percent slopes, and 30 percent Badland. The Trocken soil is on alluvial fans and terraces, and Badland is on eroded side slopes. Areas of the components of this unit are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Bluewing soils near drainageways, Stumble soils on alluvial fan skirts, Bundorf soils on higher remnants of alluvial fans, and Kayo soils on north- or east-facing slopes of alluvial fans. The unit is about 5 percent Bluewing soils, 4 percent Stumble soils, 3 percent Bundorf soils, and 3 percent Kayo soils.

The Trocken soil is very deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 3 inches thick. The substratum to a depth of 60 inches or more is brown, stratified very cobbly loam to extremely gravelly loamy coarse sand.

Permeability of the Trocken soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. The soil is subject to flash flooding during storms of unusually high intensity. Channeling and deposition are common along streambanks.

Badland consists of highly weathered water-laid tuff, diatomaceous earth, siltstone, and sandstone. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used as rangeland.

The present vegetation in most areas of the Trocken soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because the precipitation is very low.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

The main limitations to use of this soil as sites for roads are flooding and steepness of slope. Roads should be provided with drainage and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The soil in this unit is in capability subclass VIIs, nonirrigated.

1363—Trocken very stony sandy loam, 4 to 8 percent slopes. This very deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed rock sources. Elevation is 3,900 to 4,400 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 3 inches thick. The subsoil is brown gravelly sandy loam about 4 inches thick. The substratum to a depth of 60 inches or more is brown, stratified very cobbly loam to extremely gravelly loamy coarse sand.

Included in this unit are Bluewing soils in drainageways, Stumble soils on alluvial fan skirts, Isolde soils on sand dunes, and Toulon soils on shoreline terraces. The unit is about 3 percent Bluewing soils, 4 percent Stumble soils, 4 percent Isolde soils, and 4 percent Toulon soils.

Permeability of this Trocken soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used as rangeland.

The present vegetation in most areas of the Trocken soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation and low available water capacity. This soil is rated as very poorly suited to rangeland seeding, mainly because precipitation is very low.

Grazing should be adjusted to season of growth and to precipitation. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

Flooding is a moderate limitation to use of this soil as sites for roads. Roads should be provided with drainage.

This soil is in capability subclass VIIs, nonirrigated.

1364—Trocken-Wrango complex, 4 to 30 percent slopes. This map unit is on alluvial fans and terraces. Elevation is 3,900 to 5,600 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 120 days.

This unit is 50 percent Trocken very stony sandy loam, 8 to 30 percent slopes, and 35 percent Wrango gravelly loamy sand, 4 to 8 percent slopes. The Trocken soil is on dissected alluvial fans, and the Wrango soil is on tops of terraces. Areas of these soils are so intricately intermingled that it is not practical to map them separately at the scale used.

Included in this unit are Bluewing soils near drainageways, Stumble soils on alluvial fan skirts, Bundorf soils on higher remnants of alluvial fans, and Kayo soils on north- or east-facing slopes of alluvial fans. The unit is about 5 percent Bluewing soils, 4 percent Stumble soils, 3 percent Bundorf soils, and 3 percent Kayo soils.

The Trocken soil is very deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is brown, stratified very cobbly loam to extremely gravelly loamy coarse sand.

Permeability of the Trocken soil is moderate. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

The Wrango soil is very deep and excessively drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is pale brown gravelly loamy sand about 2 inches thick. The upper 6 inches of the underlying material is pale brown gravelly sand. The lower part to a depth of 60 inches is light gray extremely gravelly loamy coarse sand.

Permeability of the Wrango soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used as rangeland.

The present vegetation in most areas of the Trocken soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation and low available water capacity. This soil is rated as very poorly suited to rangeland seeding, mainly because precipitation is very low.

The present vegetation in most areas of the Wrango soil is mainly spiny hopsage, big sagebrush, and Indian ricegrass. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the very low available water capacity of the surface layer.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

The main limitations to use of this unit as sites for roads are the steepness of slope of the Trocken soil and flooding and stones of the Wrango soil. Roads should be provided with drainage and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Suitable material should be added to provide an adequate wearing surface.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1370—Singatse-Fireball-Rednik association. This map unit is on uplands and alluvial fans. Elevation is 4,400 to 5,400 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 40 percent Singatse very gravelly sandy loam, 8 to 30 percent slopes; 25 percent Fireball extremely stony fine sandy loam, 30 to 50 percent slopes; and 20 percent Rednik very stony sandy loam, 4 to 15 percent slopes. The Singatse soil is on eroded, rounded hillcrests and side slopes. The Fireball soil is on slightly concave colluvial slopes. The Rednik soil is on alluvial fans adjacent to drainageways.

Included in this unit are Stumble soils on alluvial fan skirts, Bluewing soils on alluvial fans near mouths of canyons, and Rock outcrop as peaks or rims. The unit is about 5 percent Stumble soils, 5 percent Bluewing soils, and 5 percent Rock outcrop.

The Singatse soil is very shallow and somewhat excessively drained. It formed in residuum derived dominantly from basalt and rhyolite. Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is pale brown, very gravelly sandy loam about 2 inches thick. The upper 4 inches of the underlying material is pale brown very gravelly sandy loam. The lower part to a depth of 12 inches is highly weathered bedrock. Hard bedrock is at a depth of 12 inches. Depth to weathered bedrock ranges from 4 to 10 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Singatse soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 10 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Fireball soil is deep and well drained. It formed in residuum derived dominantly from basalt. Typically, 15 to 25 percent of the surface is covered with stones. The

surface layer is light brownish gray extremely stony fine sandy loam about 3 inches thick. The subsoil is light yellowish brown very cobbly loam about 21 inches thick. The substratum is white extremely cobbly loam about 23 inches thick over hard basalt bedrock. Depth to hard basalt bedrock ranges from 40 to 60 inches.

Permeability of the Fireball soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Rednik soil is very deep and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 6 inches thick. The subsoil is brown very gravelly sandy clay loam about 14 inches thick. The substratum to a depth of 60 inches or more is pinkish gray very gravelly sandy loam.

Permeability of the Rednik soil is moderately slow. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used as rangeland.

The present vegetation in most areas of the Singatse soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, very low available water capacity of the surface layer, and shallowness of the root zone.

The present vegetation in most areas of the Fireball soil is mainly Bailey greasewood, shadscale, and bud sagebrush. The production of forage is limited by very low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, steepness of slope, and large stones on the surface.

The present vegetation in most areas of the Rednik soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of very low precipitation and very low available water capacity of the surface layer.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this unit as sites for roads are steepness of slope of all the soils, depth to rock of the Singatse soil, and flooding and large stones of the Rednik soil. Roads should be provided with an adequate wearing surface and drainage and should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided becaue of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1371—Singatse-Flex-Acrelane association. This map unit is on uplands. Elevation is 5,000 to 6,000 feet. The average annual precipitation is 6 to 10 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 30 percent Singatse very gravelly sandy loam, 8 to 30 percent slopes; 30 percent Flex very gravelly sandy loam, 15 to 50 percent slopes; and 25 percent Acrelane very stony loam, 15 to 50 percent slopes. The Singatse soil is on eroded, rounded hillcrests on south- and west-facing slopes. The Flex soil is on east- and north-facing slopes. The Acrelane soil is on peaks and ridges near granitic Rock outcrop.

Included in this unit are Old Camp soils on ridges, Stingdorn soils on small plateaus, and Rock outcrop as peaks and rims. The unit is about 5 percent Old Camp soils, 5 percent Stingdorn soils, and 5 percent Rock outcrop.

The Singatse soil is very shallow and somewhat excessively drained. It formed in residuum derived dominantly from basalt and rhyolite. Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is pale brown very gravelly sandy loam about 6 inches thick. The underlying material to a depth of 12 inches is highly weathered bedrock. Hard bedrock is at a depth of 12 inches. Depth to weathered bedrock ranges from 4 to 10 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Singatse soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 10 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Flex soil is shallow and well drained. It formed in residuum derived dominantly from altered andesite and metavolcanic rocks. Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is light brownish gray very gravelly sandy loam about 3 inches thick. The subsoil is brown very gravelly sandy clay loam about 7 inches thick. Highly weathered metavolcanic bedrock is at a depth of 10 inches. Depth to weathered bedrock ranges from 6 to 12 inches.

Permeability of the Flex soil is moderate. Available water capacity is very low. Effective rooting depth is 6 to 12 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Acrelane soil is shallow and well drained. It formed in residuum derived dominantly from granitic rock. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 6 inches thick. The subsoil is brown very

gravelly coarse sandy loam about 4 inches thick. Weathered granodiorite is at a depth of 10 inches. Depth to weathered bedrock ranges from 10 to 20 inches.

Permeability of the Acrelane soil is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Singatse soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation, very low available water capacity, and shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, the very low available water capacity of the surface layer, and the shallowness of the root zone.

The present vegetation in most areas of the Flex soil is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, steepness of slope, and the shallowness of the root zone.

The present vegetation in most areas of the Acrelane soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, steepness of slope, and the shallowness of the root zone. If this unit is used for timber production, a mature stand of trees (80 to 100 years) will yield about 4 to 8 cords of wood per acre.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are the steepness of slope and depth to bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1372—Singatse-Isolde association. This map unit is on uplands. Elevation is 4,400 to 5,000 feet. The average annual precipitation is 4 to 6 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 50 percent Singatse very gravelly sandy loam, 8 to 30 percent slopes, and 35 percent Isolde fine sand, 0 to 15 percent slopes. The Singatse soil is on rounded hillcrests and side slopes. The Isolde soil is on sand dunes superimposed over the Singatse soil.

Included in this unit are Rock outcrop as peaks and rims, Fireball soils on lower colluvial slopes, Rezave soils on small plateaus, and Trocken soils along drainageways. The unit is about 5 percent Rock outcrop, 4 percent Fireball soils, 3 percent Rezave soils, and 3 percent Trocken soils.

The Singatse soil is very shallow and somewhat excessively drained. It formed in residuum derived dominantly from basalt and rhyolite. Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is pale brown very gravelly sandy loam about 2 inches thick. The upper 4 inches of the underlying material is pale brown very gravelly sandy loam. The lower part to a depth of 12 inches is highly weathered bedrock. Hard bedrock is at a depth of 12 inches. Depth to weathered bedrock ranges from 4 to 10 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Singatse soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 10 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Isolde soil is very deep and excessively drained. It formed in wind-reworked sand derived from mixed rock sources. Slopes are 0 to 15 percent. Typically, the surface layer is light brownish gray fine sand about 6 inches thick. The underlying material to a depth of 60 inches is light brownish gray fine sand.

Permeability of the Isolde soil is very rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used as rangeland.

The present vegetation in most areas of the Singatse soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, the very low available water capacity of the surface layer, and the shallowness of the root zone.

The present vegetation in most areas of the Isolde soil is mainly spiny hopsage, hairy horsebrush, and Indian ricegrass. The production of forage is limited by the very low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation and very low available water capacity of the surface layer.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Livestock should be managed so that enough vegetation is left to

protect the unit from excessive erosion. The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this unit as sites for roads are the steepness of slope and shallowness over bedrock of the Singatse soil. Roads should be located in areas of the Isolde soil if feasible.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1373—Singatse-Mizel-Stingdorn association. This map unit is on uplands. Elevation is 4,400 to 6,400 feet. The average annual precipitation is 5 to 9 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 120 days.

This unit is 50 percent Singatse very gravelly sandy loam, 8 to 30 percent slopes; 20 percent Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes; and 15 percent Stingdorn extremely stony loam, 15 to 30 percent slopes. The Singatse soil is on eroded, slightly convex, south- and west-facing slopes. The Mizel soil is on rounded tops and north- and east-facing slopes. The Stingdorn soil is on tilted plateaus.

Included in this unit are Fireball soils on colluvial slopes near drainageways, Hefed soils on north-facing colluvial slopes, Zephan soils on smooth north- and east-facing slopes at higher elevations, and Rock outcrop as peaks and rims. The unit is about 5 percent Fireball soils, 3 percent Hefed soils, 3 percent Zephan soils, and 4 percent Rock outcrop.

The Singatse soil is shallow and somewhat excessively drained. It formed in residuum derived dominantly from basalt and rhyolite. Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is pale brown very gravelly sandy loam about 2 inches thick. The upper 4 inches of the underlying material is pale brown very gravelly sandy loam. The lower part to a depth of 12 inches is highly weathered bedrock. Hard bedrock is at a depth of 12 inches. Depth to weathered bedrock ranges from 4 to 10 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Singatse soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 10 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Mizel soil is very shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 50 to 60 percent of the surface is covered with gravel. The surface layer is very pale brown very gravelly coarse sandy loam about 3 inches thick. Hard rhyolitic bedrock is at a depth of 3 inches. Depth to bedrock ranges from 3 to 10 inches.

Permeability of the Mizel soil is moderate. Available water capacity is very low. Effective rooting depth is 3 to 10 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Stingdorn soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is pale brown extremely stony loam about 4 inches thick. The subsoil is yellowish brown very gravelly clay loam about 5 inches thick. The upper 3 inches of the substratum is pale brown very gravelly sandy loam. The lower part to a depth of 13 inches is an indurated silica-cemented hardpan. Rhyolitic bedrock is at a depth of 13 inches. Depth to bedrock ranges from 8 to 20 inches.

Permeability of the Stingdorn soil is moderately slow. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Singatse soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation, very low available water capacity, and shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, very low available water capacity of the surface layer, and shallowness of the root zone.

The present vegetation in most areas of the Mizel soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, steepness of slope, and the shallowness of the root zone over bedrock.

The present vegetation in most areas of the Stingdorn soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, very low available water capacity, and shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity of the surface layer, very low precipitation, and the shallowness of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this unit as sites for roads are the steepness of slope and restricted depth to bedrock of all three soils. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1374—Singatse-Fireball-Osobb association. This map unit is on uplands. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 90 to 110 days.

This unit is 40 percent Singatse very gravelly sandy loam, 8 to 30 percent slopes; 25 percent Fireball extremely stony fine sandy loam, 30 to 50 percent slopes; and 20 percent Osobb extremely stony fine sandy loam, 8 to 30 percent slopes. The Singatse soil is on convex south- and west-facing slopes. The Fireball soil is on colluvial slopes near drainageways. The Osobb soil is on smooth slopes and slightly convex slopes.

Included in this unit are Bombadil soils on eroded north- and east-facing slopes, Trocken soils in canyon bottoms and on short alluvial fans, Hefed soils on north-facing colluvial slopes, and Rock outcrop on rims and peaks. The unit is about 5 percent Bombadil soils, 3 percent Trocken soils, 3 percent Hefed soils, and 4 percent Rock outcrop.

The Singatse soil is very shallow and somewhat excessively drained. It formed in residuum derived dominantly from basalt and rhyolite. Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is pale brown very gravelly sandy loam about 2 inches thick. The upper 4 inches of the underlying material is pale brown very gravelly sandy loam. The lower part to a depth of 12 inches is highly weathered bedrock. Hard bedrock is at a depth of 12 inches. Depth to weathered bedrock ranges from 4 to 10 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Singatse soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 10 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Fireball soil is deep and well drained. It formed in residuum derived dominantly from basalt. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is light brownish gray extremely stony fine sandy loam about 3 inches thick. The subsoil is light yellowish brown very cobbly loam about 21 inches thick. The substratum is white very cobbly loam about 23 inches thick over hard basalt bedrock. Depth to hard basalt bedrock ranges from 40 to 60 inches.

Permeability of the Fireball soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Osobb soil is shallow and well drained. It formed in residuum of volcanic rocks. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is light brownish gray extremely stony fine sandy loam about 2 inches thick. The subsoil is pale brown very gravelly loam about 9 inches thick. The substratum is a very pale brown indurated hardpan about 2 inches thick over weathered rock. Weathered rock is at a depth of 13 inches. Depth to the hardpan ranges from 8 to 20 inches.

Permeability of the Osobb soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Singatse soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by very low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, because of the very low precipitation, very low available water capacity of the surface layer, and shallowness of the root zone.

The present vegetation in most areas of the Fireball soil is mainly Bailey greasewood, shadscale, and bud sagebrush. The production of forage is limited by the very low precipitation. The suitability of this soil for rangeland seeding is very poor, because of the very low precipitation, steepness of slope, and large stones on the surface.

The present vegetation in most areas of the Osobb soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation, very low available water capacity of the surface layer, large stones on the surface, and shallowness of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. The intensity and duration of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this unit as sites for roads are steepness of slope, stones, and restricted depth to bedrock. Roads should be provided with an adequate wearing surface and located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1380—Stingdorn-Singatse-Rock outcrop association. This map unit is on uplands. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 100 to 110 days.

This unit is 35 percent Stingdorn extremely stony loam, 15 to 30 percent slopes; 35 percent Singatse very gravelly sandy loam, 15 to 30 percent slopes; and 15 percent Rock outcrop. The Stingdorn soil is on smooth

upland slopes and plateaus; the Singatse soil is on eroded, rounded hillcrests and side slopes; and the Rock outcrop is on ridges and peaks.

Included in this unit are Fireball soils on slightly concave colluvial slopes, Yuko soils on smooth east- and north-facing slopes, and Rezave soils on the tops of plateaus. The unit is about 5 percent Fireball soils, 7 percent Yuko soils, and 3 percent Rezave soils.

The Stingdorn soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is pale brown extremely stony loam about 4 inches thick. The subsoil is yellowish brown very gravelly clay loam about 5 inches thick. The upper 3 inches of the substratum is pale brown very gravelly sandy loam. The lower part to a depth of 13 inches is an indurated silica-cemented hardpan. Rhyolitic bedrock is at a depth of 13 inches. Depth to bedrock ranges from 8 to 20 inches.

Permeability of the Stingdorn soil is moderately slow. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Singatse soil is very shallow and somewhat excessively drained. It formed in residuum of basalt and rhyolite. Typically, 35 to 60 percent of the surface is covered with gravel. The surface layer is light brownish gray very gravelly sandy loam about 2 inches thick. The underlying material is light gray very gravelly loam about 4 inches thick. Below that is highly weathered bedrock about 6 inches thick. Hard bedrock is at a depth of 12 inches. Depth to weathered bedrock ranges from 4 to 10 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Singatse soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 10 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of altered volcanic rocks as peaks and ridges.

This unit is used as rangeland.

The present vegetation in most areas of the Stingdorn soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, very low available water capacity, and shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, very low precipitation, and the shallowness of the root zone.

The present vegetation in most areas of the Singatse soil is mainly shadscale, bud sagebrush, and bottlebrush squirreltail. The production of forage is limited by the very low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation, very low available water capacity of the surface layer, and shallowness of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this unit as sites for roads are steepness of slope and shallowness of the soils over bedrock. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1390—Pirouette-Osobb-Rock outcrop association. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 5 to 7 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 90 to 100 days.

This unit is 40 percent Pirouette very stony very fine sandy loam, 0 to 8 percent slopes; 40 percent Osobb very stony very fine sandy loam, 8 to 30 percent slopes; and 10 percent Rock outcrop. The Pirouette soil is on smooth tops and small plateaus. The Osobb soil is on slightly convex slopes. Rock outcrop is on ridges or small peaks.

Included in this unit are Xman soils near Rock outcrop on north- and east-facing slopes, Fireball soils on slightly concave colluvial slopes, and Singatse soils on rounded ridges and on eroded slopes. The unit is about 4 percent Xman soils, 3 percent Fireball soils, and 3 percent Singatse soils.

The Pirouette soil is shallow and well drained. It formed in residuum derived dominantly from basalt and tuff. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony very fine sandy loam about 3 inches thick. The subsoil is light brown very cobbly clay loam about 7 inches thick. The upper 5 inches of the substratum is light brown very cobbly sandy loam. The lower part to a depth of 15 inches is a silica-cemented hardpan. Unweathered bedrock is at a depth of 16 inches. Depth to the hardpan ranges from 11 to 20 inches.

Permeability of the Pirouette soil is moderately slow. Available water capacity is very low. Effective rooting depth is 11 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Osobb soil is shallow and well drained. It formed in residuum of volcanic rocks. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light brownish gray very stony very fine sandy loam about 4 inches thick. The subsoil is pale brown very cobbly very fine sandy loam about 13 inches thick. The substratum is an indurated hardpan about 1 inch thick

over bedrock. Depth to the hardpan ranges from 8 to 20 inches.

Permeability of the Osobb soil is moderate. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of basalt or tuff as ridges or peaks.

This unit is used as rangeland.

The present vegetation in most areas of the Pirouette soil is mainly Bailey greasewood, shadscale, and bud sagebrush. The production of forage is limited by the very low precipitation, very low available water capacity, and shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation, very low available water capacity of the surface layer, large stones on the surface, and shallowness of the root zone.

The present vegetation in most areas of the Osobb soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, very low available water capacity, and shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation, very low available water capacity of the surface layer, large stones on the surface, and shallowness of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

The main limitations to use of this unit as sites for roads are depth to bedrock of both soils and steepness of slope and stones of the Osobb soil. Suitable material should be added to provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1400—Softscrabble-Gabica-Burnborough association. This map unit is on uplands. Elevation is 6,000 to 7,500 feet. The average annual precipitation is 12 to 18 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 50 to 80 days.

This unit is 30 percent Softscrabble very stony loam, 15 to 50 percent slopes; 30 percent Gabica very cobbly sandy loam, 8 to 30 percent slopes; and 25 percent Burnborough stony loam, 15 to 50 percent slopes. The Softscrabble soil is on concave side slopes of hills. The Gabica soil is on ridges and tops. The Burnborough soil is on colluvial slopes.

Included in this unit are Ticino soils, which support mountainmahogany and are near rimrocks and on ridges; Thulepah soils on higher north-facing slopes; Barshaad soils at lower elevations on flat and slightly concave slopes; and Rock outcrop on rims and small peaks. The unit is about 4 percent Ticino soils, 4 percent Thulepah soils, 3 percent Barshaad soils, and 4 percent Rock outcrop.

The Softscrabble soil is very deep and well drained. It formed in residuum and colluvium derived dominantly from basalt. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is dark brown very stony loam about 9 inches thick. The upper 21 inches of the subsoil is brown very cobbly clay loam and extremely cobbly clay loam. The lower 48 inches is yellowish brown clay loam, gravelly clay loam, and loam. Highly weathered soft bedrock is at a depth of 78 inches. Depth to weathered bedrock is more than 60 inches.

Permeability of the Softscrabble soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Gabica soil is shallow and well drained. It formed in residuum of volcanic rocks. Typically, 35 to 50 percent of the surface is covered with cobbles. The surface layer is dark grayish brown very cobbly sandy loam about 14 inches thick. The subsoil is dark yellowish brown very gravelly clay loam about 5 inches thick. Fractured unweathered bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Gabica soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Burnborough soil is very deep and well drained. It formed in residuum and colluvium derived dominantly from andesite and rhyolite. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is dark grayish brown stony loam about 17 inches thick. The subsoil is yellowish brown very gravelly loam about 43 inches thick.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Softscrabble soil is mainly big sagebrush, antelope bitterbrush, and Idaho fescue. The production of forage is limited by the short growing season and cold temperatures in spring. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope and large stones on the surface.

The present vegetation in most areas of the Gabica soil is mainly low sagebrush, Douglas rabbitbrush, and

Thurber needlegrass. The production of forage is limited by the short growing season and cold temperatures in spring, very low available water capacity, and shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, large stones on the surface, and shallowness of the root zone.

The present vegetation in most areas of the Burnborough soil is mainly big sagebrush, gray horsebrush, and Idaho fescue. The production of forage is limited by the short growing season and cold temperatures in spring. The suitability of this soil for rangeland seeding is very poor, mainly because of steepness of slope.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Cold soil temperatures delay plant growth and readiness for grazing. Grazing should be delayed until the soils are warm and the plants have achieved sufficient growth. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. Clearing of brush would encourage the growth of desirable forage grasses.

The main limitations to use of this unit as sites for roads are the steepness of slope of all the soils and the shallowness over bedrock of the Gabica soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1401—Softscrabble-Gabica-Sumine association. This map unit is on mountainous uplands. Elevation is 6,000 to 7,900 feet. The average annual precipitation is 12 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 70 to 90 days.

This unit is 35 percent Softscrabble very stony loam, 15 to 50 percent slopes; 25 percent Gabica very cobbly sandy loam, 8 to 30 percent slopes; and 25 percent Sumine very stony loam, 30 to 50 percent slopes. The Softscrabble soil is on concave slopes in snowpockets. The Gabica soil is on windswept ridges and peaks. The Sumine soil is near Rock outcrop and on convex slopes.

Included in this unit are Ticino soils, which are near rims and support mountainmahogany; Duco soils on lower, south-facing ridges; Burnborough soils on colluvial slopes near drainageways; soils similar to Blackwell soils near springs and wet seeps; and Rock outcrop on peaks and rims. The unit is about 3 percent Ticino soils, 3 percent Duco soils, 3 percent Burnborough soils, 1 percent soils similar to Blackwell soils, and 5 percent Rock outcrop.

The Softscrabble soil is very deep and well drained. It formed in residuum and colluvium derived dominantly from basalt. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is dark brown very stony loam about 9 inches thick. The upper 21 inches of the subsoil is brown very cobbly clay loam. The lower 48 inches is yellowish brown clay loam. Highly weathered soft bedrock is at a depth of 78 inches. Depth to weathered bedrock is more than 60 inches.

Permeability of the Softscrabble soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Gabica soil is shallow and well drained. It formed in residuum of volcanic rocks. Typically, 35 to 55 percent of the surface is covered with cobbles. The surface layer is dark grayish brown very cobbly sandy loam about 14 inches thick. The subsoil is dark yellowish brown very gravelly clay loam about 5 inches thick. Fractured unweathered bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Gabica soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Sumine soil is moderately deep and well drained. It formed in residuum and colluvium from mixed rocks. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony loam about 6 inches thick. The subsoil is brown very cobbly clay loam about 28 inches thick over hard bedrock. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Sumine soil is moderate. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Softscrabble soil is mainly big sagebrush, antelope bitterbrush, and Idaho fescue. The production of forage is limited by the short growing season and cold temperatures in spring. The suitability of this soil for rangeland seeding is very poor, mainly because of steepness of slope and large stones on the surface.

The present vegetation in most areas of the Gabica soil is mainly low sagebrush, Douglas rabbitbrush, and Thurber needlegrass. The production of forage is limited by the short growing season and cold temperatures in spring, the very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor. The main limitations to seeding are the very low available water capacity, the large stones on the surface, and the shallowness of the root zone.

The present vegetation in most areas of the Sumine soil is mainly big sagebrush, antelope bitterbrush, and bluebunch wheatgrass. The production of forage is limited by the low available water capacity, short growing season and cold temperatures in spring, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of steepness of slope.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Cold soil temperatures delay plant growth and readiness for grazing. Therefore, grazing should be delayed until the soils are warm and the plants have achieved sufficient growth.

The main limitations to use of this unit as sites for roads are steepness of slope of all the soils and shallowness over bedrock of the Gabica soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1410—Burnborough-Ticino-Gabica association. This map unit is on uplands. Elevation is 6,000 to 7,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 50 to 80 days.

This unit is 35 percent Burnborough very gravelly loam, 15 to 50 percent slopes; 30 percent Ticino gravelly fine sandy loam, 4 to 30 percent slopes; and 20 percent Gabica very cobbly sandy loam, 8 to 30 percent slopes. The Burnborough soil is on colluvial slopes. The Ticino soil is on lower ridges and near rimrocks. The Gabica soil is on high, windswept tops and ridges.

Included in this unit are Softscrabble soils in concave snowpockets, Barshaad soils at lower elevations on flat and slightly concave slopes, and Rock outcrop on peaks and ridges. The unit is about 6 percent Softscrabble soils, 4 percent Barshaad soils, and 5 percent Rock outcrop.

The Burnborough soil is very deep and well drained. It formed in residuum and colluvium derived dominantly from andesite and rhyolite. Slope is 15 to 50 percent. Typically, 35 to 50 percent of the surface is covered with gravel. The surface layer is dark grayish brown very gravelly loam about 17 inches thick. The subsoil is yellowish brown very gravelly loam about 43 inches thick.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Ticino soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from andesite, rhyolite, and metasedimentary rocks. Typically, 15 to 35 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly fine sandy loam about 11 inches thick. The subsoil is brown gravelly loam about 11 inches thick. Highly weathered bedrock is at a depth of 22 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Ticino soil is moderate. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Gabica soil is shallow and well drained. It formed in residuum of volcanic rocks. Typically, 35 to 55 percent of the surface is covered with cobbles. The surface layer is dark grayish brown very cobbly sandy loam about 14 inches thick. The subsoil is dark yellowish brown very gravelly clay loam about 5 inches thick. Fractured unweathered bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Gabica soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Burnborough soil is mainly big sagebrush, gray horsebrush, and Idaho fescue. The production of forage is limited by the short growing season and cold temperatures in spring. The suitability of this soil for rangeland seeding is poor, mainly because of steepness of slope.

The present vegetation in most areas of the Ticino soil is mainly mountainmahogany, big sagebrush, and arrowleaf balsamroot. The production of forage is limited by the low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is fair because of competition of the trees, low available water capacity, and the restricted depth of the root zone.

The present vegetation in most areas of the Gabica soil is mainly low sagebrush, Douglas rabbitbrush, and Thurber needlegrass. The production of forage is limited by the short growing season and cold temperatures in spring, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity of the surface layer and the restricted depth of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Cold soil temperatures delay plant growth and readiness for grazing. Therefore, grazing should be delayed until the soils are warm and the plants have achieved sufficient growth. Clearing of brush would encourage the growth of desirable forage grasses.

The main limitations to use of this unit as sites for roads are steepness of slope of all the soils and the shallowness over bedrock of the Gabica soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The Ticino soil is in capability subclass VIe, nonirrigated. The Sumine and Gabica soils are in capability subclass VIIs, nonirrigated.

1411—Burnborough-Ticino-Softscrabble association. This map unit is on uplands. Elevation is 6,000 to 7,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 50 to 80 days.

This unit is 35 percent Burnborough very gravelly loam, 15 to 50 percent slopes; 30 percent Ticino gravelly fine sandy loam, 4 to 30 percent slopes; and 20 percent Softscrabble very stony loam, 15 to 50 percent slopes. The Burnborough soil is on colluvial slopes. The Ticino soil is on ridges and near rimrocks. The Softscrabble soil is in concave snowpockets.

Included in this unit are Thulepah soils on higher, north-facing slopes; Barshaad soils at lower elevations on flat and slightly concave slopes; and Rock outcrop on peaks and ridges. The unit is about 5 percent Thulepah soils, 5 percent Barshaad soils, and 5 percent Rock outcrop.

The Burnborough soil is very deep and well drained. It formed in residuum and colluvium derived dominantly from andesite and rhyolite. Typically, 30 to 55 percent of the surface is covered with gravel. The surface layer is dark grayish brown very gravelly loam about 17 inches thick. The subsoil is yellowish brown very gravelly loam about 43 inches thick.

Permeability of the Burnborough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Ticino soil is moderately deep and well drained. It formed in residuum and colluvium derived dominantly from andesite, rhyolite, and metamorphic rocks. Typically, 10 to 20 percent of the surface is covered with gravel. The surface layer is grayish brown gravelly fine sandy loam about 11 inches thick. The subsoil is brown gravelly loam about 11 inches thick. Highly weathered bedrock is at a depth of 22 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Ticino soil is moderate. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Softscrabble soil is very deep and well drained. It formed in residuum and colluvium derived dominantly from basalt. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is dark brown very stony loam about 9 inches thick. The upper 21 inches of the subsoil is brown very cobbly clay loam. The lower 48 inches is yellowish brown clay loam. Highly weathered soft bedrock is at a depth of 78 inches. Depth to weathered bedrock is more than 60 inches.

Permeability of the Softscrabble soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Burnborough soil is mainly big sagebrush, gray horsebrush, and Idaho fescue. The production of forage suitable for livestock grazing is limited by the short growing season and cold temperatures in spring. The suitability of this soil for rangeland seeding is poor, mainly because of the steepness of slope.

The present vegetation in most areas of the Ticino soil is mainly mountainmahogany, big sagebrush, and arrowleaf balsamroot. The production of forage is limited by low available water capacity and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is fair. The main limitations to seeding are competition of the trees, low available water capacity, and the restricted depth of the root zone.

The present vegetation in most areas of the Softscrabble soil is mainly big sagebrush, antelope bitterbrush, and Idaho fescue. The production of forage is limited by the short growing season and cold temperatures in spring. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope and the large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Cold soil temperatures delay plant growth and readiness for grazing. Grazing should be delayed until the soils are warm and the plants have achieved sufficient growth. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion. Clearing of brush would encourage the growth of desirable forage grasses.

The main limitation to use of this unit as sites for roads is steepness of slope. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion.

The Ticino soil is in capability subclass VIe, nonirrigrated. The Softscrabble and Burnborough soils are in capability subclass VIIs, nonirrigated.

1420—Barshaad-Fugawee-Duckhill Variant association. This map unit is on mountainous uplands. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 14 to 35 inches, the average annual air

temperature is 41 to 44 degrees F, and the average frost-free period is 68 to 80 days.

This unit is 35 percent Barshaad very stony loam, 2 to 15 percent slopes; 30 percent Fugawee stony sandy loam, 15 to 50 percent slopes; and 20 percent Duckhill Variant very stony sandy loam, 30 to 70 percent slopes. The Barshaad soil is on tops and plateau remnants at lower elevations. The Fugawee soil is on smooth, slightly convex slopes. The Duckhill Variant soil is adjacent to and on ridges.

Included in this map unit are Ticino soils, which support mountainmahogany and are on ridges and plateau rims; Jumbo soils on lower, colluvial, north-facing slopes; and Rock outcrop on peaks and ridges. The unit is about 5 percent Ticino soils, 5 percent Jumbo soils, and 5 percent Rock outcrop.

The Barshaad soil is moderately deep and well drained. It formed in residuum dominantly of metavolcanic and metasedimentary rock. Typically, 3 to 15 percent of the surface is covered with stones and some cobbles. The surface layer is grayish brown very stony loam about 1 inch thick. The subsoil is brown gravelly clay about 23 inches thick. Weathered bedrock is at a depth of 24 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Barshaad soil is very slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Fugawee soil is moderately deep and well drained. It formed in residuum dominantly of volcanic rock. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is pale brown stony sandy loam about 17 inches thick. The subsoil is pale brown gravelly clay loam about 20 inches thick. Highly weathered volcanic rock is at a depth of 37 inches. Depth to highly weathered volcanic rock ranges from 20 to 40 inches.

Permeability of the Fugawee soil is moderately slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. The Fugawee soil in this unit is slightly drier than is typical for the Fugawee soils.

The Duckhill Variant soil is shallow and well drained. It formed in residuum dominantly of volcanic rock. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 8 inches thick. The subsoil is yellowish brown very cobbly clay loam about 5 inches thick. Hard bedrock is at a depth of 13 inches. Depth to bedrock ranges from 4 to 14 inches.

Permeability of the Duckhill Variant soil is moderately slow. Available water capacity is very low. Effective rooting depth is 4 to 14 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as woodland and rangeland.

The present vegetation on the Barshaad soil in most areas is mainly low sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by moderately low precipitation, very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The present vegetation on the Fugawee soil in most areas is mainly white fir, California red fir, lodgepole pine, and whitebark pine with an understory of snowbrush ceanothus, manzanita, and squawcarpet. This soil is suited to white fir, California red fir, and western white pine. If planted to white fir, the soil can produce about 8,200 cubic feet, or 48,400 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. It can produce about 8,150 cubic feet, or 44,500 board feet (Scribner rule), if planted to California red fir or about 3,100 cubic feet, or 13,100 board feet (Scribner rule), if planted to western white pine. The steepness of slope limits the kind of equipment that can be used in forest management.

The present vegetation on the Duckhill Variant soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and mountainmahogany. In some areas, mostly mountainmahogany grows. The production of merchantable timber is very low, and natural regeneration of trees is difficult because of marginal precipitation, shallowness of soil, and plant competition. If the woodland is to be maintained, only selective harvesting should be practiced. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. The steepness of slope limits the kind of equipment that can be used in forest management. Management that minimizes the risk of erosion is essential to harvesting timber.

The main limitations to use of this soil as sites for roads are the low strength and high clay content of the Barshaad soil, steepness of slope of the Fugawee soil, and shallowness over bedrock and steepness of slope of the Duckhill Variant soil. Suitable base material and an adequate wearing surface are needed. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided in the Duckhill Variant soil because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1430—Fraval-Booford-Jumbo association. This map unit is on mountainous uplands. Elevation is 6,000 to 7,000 feet. The average annual precipitation is 16 to 30 inches, the average annual air temperature is 43 to 45 degrees F, and the average frost-free period is 50 to 80 days.

This unit is 35 percent Fraval very stony loam, 30 to 50 percent slopes; 30 percent Booford very stony loam, 8 to 30 percent slopes; and 20 percent Jumbo very stony loam, 30 to 50 percent slopes. The Fraval soil is on shoulders of ridges and on convex slopes. The Booford soil is on lower, smooth slopes. The Jumbo soil is on concave lower colluvial slopes that generally face north.

Included in this map unit are Ticino soils, which support mountainmahogany and are near rimrocks; Macareeno soils, which support quaking aspen and are near seeps and streams; Hirschdale soils, which are on higher colluvial slopes generally facing south; and Rock outcrop on peaks and rims. The unit is about 4 percent Ticino soils, 4 percent Macareeno soils, 4 percent Hirschdale soils, and 3 percent Rock outcrop.

The Fraval soil is moderately deep and well drained. It formed in residuum dominantly of volcanic rock. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is dark grayish brown very stony loam about 9 inches thick. The subsoil is brown very gravelly loam about 18 inches thick. Weathered tuff is at a depth of 27 inches. Depth to weathered tuff ranges from 20 to 40 inches.

Permeability of the Fraval soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Booford soil is moderately deep and well drained. It formed in residuum dominantly of andesitic tuff. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 8 inches thick. The subsoil is dark brown clay about 17 inches thick. Weathered andesitic tuff is at a depth of 25 inches. Depth to weathered andesitic tuff ranges from 20 to 40 inches.

Permeability of the Booford soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Jumbo soil is deep and well drained. It formed in residuum and colluvium dominantly of volcanic rock. Slope is 30 to 50 percent. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is dark grayish brown very stony loam about 21 inches thick. The subsoil is brown very cobbly clay loam about 33 inches thick. Weathered tuff is at a depth of 54 inches. Depth to weathered tuff ranges from 40 to 60 inches.

Permeability of the Jumbo soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as woodland and rangeland.

The present vegetation on the Fraval soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and Sandberg bluegrass. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, the soil can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. The steepness of slope limits the kind of equipment that can be used in forest management. Management that minimizes the risk of erosion when harvesting timber is essential.

The present vegetation on the Booford soil in most areas is mainly big sagebrush, antelope bitterbrush, mountainmahogany, and bottlebrush squirreltail. If this soil is managed as rangeland, the production of forage is limited by the moderate available water capacity and the restricted depth of the root zone over bedrock. The soil is rated as poorly suited to rangeland seeding because of the steepness of slope. Cold soil temperature delays plant growth and readiness for grazing; therefore, grazing should be delayed until the soils are warm and the plants have achieved sufficient growth.

The present vegetation on the Jumbo soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and mountainmahogany. In burned or harvested areas, mountainmahogany dominates, especially on north-facing slopes. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, this soil can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. Management that minimizes the risk of erosion is essential. The steepness of slope limits the kind of equipment that can be used in forest management.

The main limitations for the use of the soil as sites for roads are steepness of slope of all the soils and the low strength and high clay content of the Booford soil. Roads should be provided with a stable base and an adequate wearing surface and, if possible, should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1431—Fraval-Hirschdale-Duckhill Variant association. This map unit is on mountainous uplands. Elevation is 6,000 to 7,500 feet. The average annual precipitation is 18 to 45 inches, the average annual air temperature is 43 to 45 degrees F, and the average frost-free period is 50 to 80 days.

This unit is 35 percent Fraval very stony loam, 30 to 50 percent slopes; 25 percent Hirschdale very stony

loam, 30 to 50 percent slopes; and 25 percent Duckhill Variant very stony sandy loam, 30 to 70 percent slopes. The Fraval soil is on lower east- and north-facing slopes. The Hirschdale soil is on higher, slightly convex slopes. The Duckhill Variant soil is on ridges.

Included in this map unit are Jumbo soils on concave and lower colluvial north-facing slopes; Macareeno soils, which support quaking aspen and are near seeps and streams; Ticino soils, which support mountainmahogany and are near rims; and Rock outcrop on peaks and rims. The unit is about 4 percent Jumbo soils, 4 percent Macareeno soils, 4 percent Ticino soils, and 3 percent Rock outcrop. Also included near the California state line are some soils similar to Fugawee soils that receive slightly less precipitation.

The Fraval soil is moderately deep and well drained. It formed in residuum dominantly of volcanic rock. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is dark grayish brown very stony loam about 9 inches thick. The subsoil is brown very gravelly loam about 18 inches thick. Weathered tuff is at a depth of 27 inches. Depth to weathered tuff ranges from 20 to 40 inches.

Permeability of the Fraval soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Hirschdale soil is moderately deep and well drained. It formed in residuum dominantly of andesite. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 6 inches thick. The subsoil is reddish brown clay about 33 inches thick. Weathered, altered, and bleached andesite is at a depth of 39 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Hirschdale soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Duckhill Variant soil is shallow and well drained. It formed in residuum dominantly of volcanic rock. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 8 inches thick. The subsoil is yellowish brown very cobbly clay loam about 5 inches thick. Hard bedrock is at a depth of 13 inches. Depth to hard bedrock ranges from 4 to 14 inches.

Permeability of the Duckhill Variant soil is moderately slow. Available water capacity is very low. Effective rooting depth is 4 to 14 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation on the Fraval soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and Sandberg bluegrass. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, the soil can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. The steepness of slope limits the kind of equipment that can be used in forest management. Management that minimizes the risk of erosion is essential.

The present vegetation on the Hirschdale soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, mountainmahogany, muleears, and squawcarpet. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, this soil can produce about 3,300 cubic feet, or 14,400 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. The steepness of slope limits the kind of equipment that can be used in forest management. Management that minimizes the risk of erosion is essential.

The present vegetation on the Duckhill Variant soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and mountainmahogany. In some areas mountainmahogany is dominant. The production of merchantable timber is very low, and natural regeneration of trees is difficult because of marginal precipitation, shallowness of soil, and plant competition. If the woodland is to be maintained, only selective harvesting should be practiced.

Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees. Management that minimizes the risk of erosion is essential. The steepness of slope limits the kind of equipment that can be used in forest management.

The main limitations to use of this unit as sites for roads are steepness of slope, low strength, and high clay content of the Hirschdale soil; depth to bedrock and steepness of slope of the Duckhill Variant soil; and steepness of slope of the Fraval soil. Suitable base material and an adequate wearing surface are needed. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided in the Duckhill Variant soil because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1432—Fraval-Hirschdale-Jumbo association. This map unit is on mountainous uplands. Elevation is 6,000 to 7,000 feet. The average annual precipitation is 18 to 45 inches, the average annual air temperature is 43 to 45 degrees F, and the average frost-free period is 50 to 60 days.

This unit is 35 percent Fraval very stony loam, 30 to 50 percent slopes; 30 percent Hirschdale very stony loam, 15 to 50 percent slopes; and 20 percent Jumbo very stony loam, 30 to 50 percent slopes. The Fraval soil

is on lower east- and north-facing slopes. The Hirschdale soil is at higher elevations on all aspects. The Jumbo soil is on lower colluvial and concave slopes.

Included in this map unit are Boomtown soils on north-facing slopes at higher elevations, Rock outcrop on peaks and ridges, Macareeno soils near seeps and streams, and Booford soils on lower south-facing slopes. The unit is about 5 percent Boomtown soils, 5 percent Rock outcrop, 3 percent Macareeno soils, and 2 percent Booford soils.

The Fraval soil is moderately deep and well drained. It formed in residuum dominantly of volcanic rock. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is dark grayish brown very stony loam about 9 inches thick. The subsoil is brown very gravelly loam about 18 inches thick. Weathered tuff is at a depth of 27 inches. Depth to weathered tuff ranges from 20 to 40 inches.

Permeability of the Fraval soil is moderate. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Hirschdale soil is moderately deep and well drained. It formed in residuum dominantly of andesite. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 6 inches thick. The subsoil is reddish brown clay about 33 inches thick. Weathered bedrock is at a depth of 39 inches. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Hirschdale soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Jumbo soil is deep and well drained. It formed in residuum and colluvium dominantly of volcanic rock. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is dark grayish brown very stony loam about 21 inches thick. The subsoil is brown very cobbly clay loam about 33 inches thick. Weathered tuff is at a depth of 54 inches. Depth to weathered tuff ranges from 40 to 60 inches.

Permeability of the Jumbo soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation on the Fraval soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and Sandberg bluegrass. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The present vegetation on the Hirschdale soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, mountainmahogany, muleears, and squawcarpet. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, this soil can produce about 3,300 cubic feet, or 14,400 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The present vegetation on the Jumbo soil in most areas is mainly Jeffrey pine with an understory of big sagebrush, antelope bitterbrush, and mountainmahogany. In some areas mountainmahogany dominates the plant community. This soil is suited to Jeffrey pine. If planted to Jeffrey pine, it can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.

In all the soils, the steepness of slope limits the kind of equipment that can be used in forest management. Management that minimizes the risk of erosion is essential.

The main limitations to use of this unit as sites for roads are steepness of slope of all these soils and the low strength and high clay content of the Hirschdale soil. Suitable base material and an adequate wearing surface are needed. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1440—Tallac very bouldery sandy loam, 4 to 30 percent slopes. This deep, well drained soil is on glacial moraines. It formed in glacial deposits derived from mixed rock sources. Elevation is 7,500 to 8,600 feet. The average annual precipitation is 35 to 40 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 30 to 50 days.

Typically, 5 to 15 percent of the surface is covered with boulders. The surface layer is brown very bouldery sandy loam about 26 inches thick. The upper part of the substratum, to a depth of 45 inches, is light yellowish brown very stony sandy loam. The lower part of the substratum is weakly silica-cemented very bouldery loamy sand. Depth to the silica cementation ranges from 40 to 60 inches.

Included in this map unit are Macareeno soils, which support quaking aspen and are near seeps and along streams; Burnborough soils on colluvial slopes; Carioca soils on higher plateau remnants; and wet areas in drainageways. The unit is about 5 percent Macareeno soils, 3 percent Burnborough soils, 4 percent Carioca soils, and 3 percent wet areas.

Permeability of this Tallac soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation in most areas is mainly California red fir, white fir, and Jeffrey pine with an understory of pinemat manzanita, big sagebrush, and snowbrush ceanothus. This soil is suited to California red fir. If planted to California red fir, it can produce about 10,550 cubic feet, or 65,700 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

Stones on the surface can interfere with felling, yarding, and other operations involving the use of equipment.

The main limitations to the use of this soil as sites for the construction of roads are steepness of slope and stoniness. Roads should be provided with an adequate wearing surface and, if possible, should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIs, nonirrigated.

1441—Tallac stony sandy loam, 30 to 50 percent slopes. This deep, well drained soil is on glacial moraines. It formed in glacial deposits derived from mixed rock. Elevation is 7,500 to 9,000 feet. The average annual precipitation is 35 to 40 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 30 to 50 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 26 inches thick. The upper part of the substratum, to a depth of 45 inches, is light yellowish brown very stony sandy loam. The lower part of the substratum is weakly silica-cemented very bouldery loamy sand. Depth to silica cementation ranges from 40 to 60 inches.

Included in this map unit are Macareeno soils, which support quaking aspen and are near seeps and along streams; Sibelia soils below ridges and peaks; Meiss soils on ridges; and Rock outcrop on crests and peaks. The unit is about 5 percent Macareeno soils, 4 percent Sibelia soils, 4 percent Meiss soils, and 2 percent Rock outcrop.

Permeability of this Tallac soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation in most areas is mainly California red fir, white fir, and Jeffrey pine with an understory of pinemat manzanita, big sagebrush, and snowbrush ceanothus. This soil is suited to California red fir. If planted to California red fir, it can produce about 10,550 cubic feet, or 65,700 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

The steepness of slope limits the kind of equipment that can be used in forest management. Management that minimizes the risk of erosion is essential.

The main limitation to use of this unit as sites for roads is steepness of slope. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

This soil is in capability subclass VIIs, nonirrigated.

1450—Meiss-Sibelia-Rock outcrop association. This map unit is on mountainous uplands. Elevation is 8,000 to 10,000 feet. The average annual precipitation is 35 to 50 inches, the average air temperature is 39 to 41 degrees F, and the average frost-free period is 30 to 50 days.

This unit is 40 percent Meiss very cobbly sandy loam, 15 to 50 percent slopes; 30 percent Sibelia very stony sandy loam, 15 to 50 percent slopes; and 15 percent Rock outcrop. The Meiss soil is near peaks and ridges. The Sibelia soil is on high colluvial slopes.

Included in this unit are Macareeno soils, which support quaking aspen and occur near seeps and streams; Fugawee soils, which occur on lower slopes; and Tallac soils, which occur on remnants of glacial moraines. The unit is about 5 percent Macareeno soils, 5 percent Fugawee soils, and 5 percent Tallac soils. The percentage varies from one area to another.

The Meiss soil is shallow and excessively drained. It formed in residuum dominantly of andesitic breccia. Typically, 35 to 50 percent of the surface is covered with cobbles. The surface layer is brown very cobbly sandy loam about 7 inches thick. The underlying material is yellowish brown gravelly loam about 13 inches thick over bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Meiss soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Sibelia soil is deep and well drained. It formed in colluvium and residuum from mixed rock, but dominantly andesite and basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 6 inches thick. The subsoil is pale brown very gravelly sandy loam about 14 inches thick. The substratum is pale brown very cobbly sandy loam about 27 inches thick over highly weathered bedrock. Depth to bedrock ranges from 40 to 60 inches.

Permeability of the Sibelia soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

Rock outcrop consists of exposed areas of andesite and basalt that occurs as peaks and ridges.

This unit is used as woodland and rangeland.

The present vegetation in most areas of the Meiss soil is mainly big sagebrush, lupine, muleears, and grass. The production of forage is limited by very low available water capacity, short growing season and cold temperature in spring, and restricted depth of the root zone over bedrock. The soil is rated poor for rangeland seeding because of the very low available water capacity, steepness for slope, and large stones on the surface.

The steepness of slope limits access by livestock and promotes overgrazing on less sloping areas. Cold soil temperature delays plant growth and readiness for grazing. Therefore, grazing should be delayed until the soils are warm and the plants have achieved sufficient growth.

The present vegetation in most areas of the Sibelia soil is mainly whitebark pine and western white pine with an understory of big sagebrush, mountain brome, and bottlebrush squirreltail. If planted to western white pine, this soil can produce about 2,200 cubic feet, or 8,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old.

Stones on the surface and Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment. The steepness of slope limits the kinds of equipment that can be used in forest management.

The main limitations to use of the unit as sites for roads are steepness of slope for both soils and depth to bedrock of the Meiss soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided on the Meiss soil because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1460—Jorge-Boomtown-Fugawee association. This map unit is on mountainous uplands. Elevation is 7,500 to 9,000 feet. The average annual precipitation is 35 to 50 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 30 to 50 days.

This unit is 35 percent Jorge very stony sandy loam, 15 to 50 percent slopes; 30 percent Boomtown very stony sandy loam, 30 to 50 percent slopes; and 20 percent Fugawee very stony sandy loam, 15 to 50 percent slopes. The Jorge soil is on long, smooth colluvial slopes. The Boomtown soil is below rims of plateaus on north-facing slopes. The Fugawee soil is on plateau remnants and east-facing side slopes.

Included in this unit are Carioca soils on flat and slightly concave slopes; Macareeno soils, which support quaking aspen and occur near seeps and streams; Rock outcrop, which occurs as peaks and rims; and soils that are similar to the Fugawee soil except that they have slopes of 4 to 15 percent. Also included near the California state line are Meiss soils on rims and Tallac soils on glacial remnants. The unit is about 4 percent Carioca soils, 4 percent Macareeno soils, 3 percent Rock outcrop, 2 percent soils similar to Fugawee soil, 1 percent Meiss soils, and 1 percent Tallac soils.

The Jorge soil is very deep and well drained. It formed in residuum and colluvium derived dominantly from basic volcanic rock. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is dark brown very stony sandy loam about 9 inches thick. The upper part of the subsoil is yellowish brown very stony loam about 15 inches thick. The lower part of the subsoil is light yellowish brown extremely gravelly loam about 28 inches thick. The substratum to a depth of 65 inches or more is very pale brown very gravelly sandy loam. Depth to bedrock ranges from 60 to 80 inches.

Permeability of the Jorge soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 to 80 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Boomtown soil is very deep and well drained. It formed in residuum and colluvium derived dominantly from andesite. Typically, stones cover 3 to 15 percent of the surface. The surface layer is brown very stony sandy loam about 17 inches thick. The subsurface layer is light yellowish brown gravelly loam about 5 inches thick. The subsoil is very pale brown clay about 31 inches thick. The substratum to a depth of 61 inches is yellow clay loam.

Permeability of the Boomtown soil is very slow. Available water capacity is high. Effective rooting depth is more than 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Fugawee soil is moderately deep and well drained. It formed in residuum derived dominantly from basic volcanic rock. Typically, stones cover 3 to 15 percent of the surface. The surface layer is brown very stony sandy loam about 17 inches thick. The subsoil is pale brown cobbly loam about 12 inches thick. Highly weathered volcanic rock is at a depth of 29 inches. Depth to highly weathered volcanic rock ranges from 20 to 40 inches.

Permeability of the Fugawee soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation on the Jorge soil in most areas is mainly California red fir, white fir, and Jeffrey pine with an understory of manzanita, snowbrush ceanothus, and squawcarpet. This soil is suited to white fir and California

red fir. If planted to white fir, it can produce about 8,200 cubic feet, or 48,400 board feet (Scribner rule) of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. If planted to California red fir, it can produce about 8,150 cubic feet, or 44,500 board feet (Scribner rule).

The present vegetation on the Boomtown soil in most areas is mainly California red fir, white fir, western white pine, and Jeffrey pine with an understory of manzanita and snowbrush ceanothus. This soil is suited to Jeffrey pine, white fir, and California red fir. If planted to Jeffrey pine, it can produce about 3,600 cubic feet, or 16,400 board feet (Scribner rule) of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. It can produce about 9,800 cubic feet, or 61,000 board feet (Scribner rule) if planted to white fir or about 10,500 cubic feet, or 65,700 board feet (Scribner rule) if planted to California red fir.

The present vegetation on the Fugawee soil in most areas is mainly white fir, California red fir, lodgepole pine, and whitebark pine with an understory of snowbrush ceanothus, manzanita, and squawcarpet. This soil is suited to white fir, California red fir, and western white pine. If planted to white fir, it can produce about 8,200 cubic feet, or 48,400 board feet (Scribner rule) of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. It can produce about 8,150 cubic feet, or 44,500 board feet (Scribner rule), if planted to California red fir, or about 3,100 cubic feet, or 13,100 board feet (Scribner rule), if planted to western white pine.

On all the soils the steepness of slope limits the kinds of equipment that can be used in forest management. Stones on the surface and Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment.

The main limitations to use of the unit as sites for roads are the steepness of slope of all the soils and the low load-bearing strength and high shrink-swell potential of the Boomtown soil. Roads should be provided with a stable base and an adequate wearing surface and, if feasible, should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1470—Carioca-Sibelia Variant-Fugawee association. This map unit is on mountainous uplands. Elevation is 8,000 to 9,000 feet. The average annual precipitation is 35 to 50 inches, the average air temperature is 40 to 42 degrees F, and the average frost-free period is 30 to 50 days.

This unit is 40 percent Carioca stony sandy loam, 4 to 15 percent slopes; 25 percent Sibelia Variant stony loam, 4 to 30 percent slopes; and 20 percent Fugawee very stony sandy loam, 15 to 50 percent slopes. The Carioca soil is on mountain side slopes and on higher parts of plateaus. The Sibelia Variant soil is on slightly concave slopes of lower parts of plateaus. The Fugawee soil is on rounded ridges and on convex slopes of plateaus.

Included in this map unit are Blackwell soils near small lakes and wet spots; Macareeno soils, which support quaking aspen and are along streams and in snowpockets; Sibelia soils on high colluvial slopes; soils similar to Tallac soils on moraines that have granitic boulders; and rock outcrop on ridges and rims. The unit is about 4 percent Blackwell soils, 4 percent Macareeno soils, 3 percent Sibelia soils, 2 percent soils similar to Tallac soils, and 2 percent Rock outcrop.

The Carioca soil is deep and moderately well drained. It formed in residuum and colluvium dominantly of andesite. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 7 inches thick. The subsurface layer is pale brown very gravelly sandy loam about 23 inches thick. The subsoil is pale brown very gravelly loam about 26 inches thick. The substratum is pale brown gravelly loam about 9 inches thick over weathered bedrock. Depth to soft bedrock ranges from 60 to 80 inches.

Permeability of the Carioca soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more for plants that are water tolerant, but is limited by a fluctuating water table during some periods of the year for plants that are not water tolerant. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A high water table is at a depth of 40 to 72 inches during snowmelt.

The Sibelia Variant soil is very deep and somewhat poorly drained. It formed in colluvium and residuum dominantly of andesite and basalt. Typically, 1 to 3 percent of the surface is covered with rocks. The surface layer is brown stony loam about 21 inches thick. The substratum to a depth of 60 inches or more is yellowish brown very cobbly loam or very cobbly sandy loam.

Permeability of the Sibelia Variant soil is moderately rapid. Available water capacity is moderate. Effective rooting depth is 60 inches for plants that are water tolerant but is limited to a depth of 30 to 60 inches for plants that are not water tolerant. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. A high water table is at a depth of 30 to 60 inches during winter and spring.

The Fugawee soil is moderately deep and well drained. It formed in residuum and colluvium dominantly of basic volcanic rock. Slope is 15 to 50 percent. Typically, 5 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 17 inches thick. The subsoil is pale brown gravelly clay loam about 20 inches thick. Highly weathered volcanic rock is at a depth of 37 inches. Depth to highly weathered volcanic rock ranges from 20 to 40 inches.

Permeability of the Fugawee soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as woodland.

The present vegetation on the Carioca soil in most areas is mainly lodgepole pine and western white pine. If planted to lodgepole pine, this soil can produce about 2,550 cubic feet, or 10,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. This soil is wet in the spring. Management activities should be delayed until the soil is dry.

The present vegetation on the Sibelia Variant soil in most areas is mainly lodgepole pine and western white pine with an understory of grass. This soil is suited to western white pine. If planted to western white pine, it can produce about 3,100 cubic feet, or 13,100 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. This soil is wet in the spring. Management activities should be delayed until the soil is dry.

The present vegetation on the Fugawee soil in most areas is mainly white fir, California red fir, lodgepole pine, and whitebark pine with an understory of snowbrush ceanothus, manzanita, and squawcarpet. This soil is suited to white fir, California red fir, and western white pine. If planted to white fir, it can produce about 8,200 cubic feet, or 48,400 board feet (Scribner rule) of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. It can produce about 8,150 cubic feet, or 44,500 board feet (Scribner rule), if planted to California red fir or about 3,100 cubic feet, or 13,100 board feet (Scribner rule), if planted to western white pine.

The steepness of slope limits the kind of equipment that can be used in forest management. Stones on the surface and Rock outcrop can interfere with felling, yarding, and other operations involving the use of equipment.

The main limitation to use of the soil as sites for roads is steepness of slope. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1480—Macareeno-Blackwell-Carioca association. This map unit is on mountainous uplands. Elevation is 8,000 to 9,500 feet. The average annual precipitation is 25 to 50 inches, the average annual air temperature is 40 to 42 degrees F, and the average frost-free period is 30 to 50 days.

This unit is 40 percent Macareeno loam, 8 to 15 percent slopes; 30 percent Blackwell sandy loam, 0 to 4 percent slopes; and 15 percent Carioca stony sandy loam, 4 to 30 percent slopes. The Macareeno soil is in snow pockets and near streams. The Blackwell soil is on flood plains and wet seeps. The Carioca soil is on higher parts of plateaus.

Included in this map unit are Fugawee soils that are on rounded ridges and support stunted lodgepole pine, Tallac soils along moraines, wet areas that occur as seeps, and Burnborough soils on colluvial slopes. The unit is about 5 percent Fugawee soils, 4 percent Tallac soils, 3 percent wet areas, and 3 percent Burnborough soils.

The Macareeno soil is deep and poorly drained. It formed in residuum and colluvium of mixed but dominantly volcanic rock. Typically, the surface layer is dark grayish brown loam about 11 inches thick. The subsoil is light yellowish brown gravelly clay loam about 30 inches thick. The substratum to a depth of 54 inches or more is pale brown very cobbly loam.

Permeability of the Macareeno soil is slow. Available water capacity is moderate. Effective rooting depth is 60 inches for plants that are water tolerant but is limited to a depth of 24 to 40 inches for plants that are not water tolerant. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 24 to 40 inches in late winter and spring. This soil is subject to flooding during periods of unusually high snowmelt.

The Blackwell soil is very deep and poorly drained. It formed in alluvium derived from mixed rock. Typically, the surface layer is grayish brown sandy loam about 11 inches thick. The underlying material to a depth of 60 inches or more is mottled, stratified gravelly coarse sand through clay loam.

Permeability of the Blackwell soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches for plants that are water tolerant but is limited by a high water table for plants that are not water tolerant. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 0 to 30 inches from winter to midsummer. This soil is subject to occasional flooding during periods of high runoff from snowmelt. Channeling and deposition are common along streambanks.

The Carioca soil is deep and moderately well drained. It formed in residuum and colluvium dominantly of andesite. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is brown stony sandy loam about 7 inches thick. The subsurface layer is pale brown very gravelly sandy loam about 23 inches thick. The subsoil is pale brown very gravelly loam about 26 inches thick. The substratum is pale brown gravelly loam about 9 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 60 to 80 inches.

Permeability of the Carioca soil is moderate. Available water capacity is moderate. Effective rooting depth is 60

inches or more but is limited by a fluctuating water table during some periods of the year for plants that are not water tolerant. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 36 to 72 inches during snowmelt.

This unit is used as woodland and rangeland.

The present vegetation on the Macareeno soil in most areas is mainly quaking aspen with an understory of grass. A small amount of juniper is dispersed throughout the area. This soil is suited to quaking aspen. A mature stand of trees, 80 to 100 years old, yields about 20 to 30 cords of wood per acre. If this Macareeno soil is managed for range, forage production is limited by the short growing season and cold temperature in spring and by plant competition. Cold soil temperature delays plant growth and readiness for grazing. Therefore, grazing should be delayed until the soils are warm and the plants have achieved sufficient growth.

The present vegetation on the Blackwell soil in most areas is mainly grass. If this soil is managed for range, the production suitable for livestock grazing is limited by the short growing season and cold temperature in spring. The high water table limits the suitable species that can be introduced. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

The present vegetation on the Carioca soil in most areas is mainly lodgepole pine with an understory of snowbrush ceanothus, arrowleaf balsamroot, and grass. If planted to lodgepole pine, this soil can produce about 2,550 cubic feet, or 10,800 board feet (Scribner rule), of merchantable timber per acre from a fully stocked stand of even-aged trees 100 years old. This soil is wet in the spring. Management activities should be delayed until the soil is dry.

The main limitations to use of this unit as sites for roads are the susceptibility to frost heaving of the Macareeno soil; the high water table, flooding, and susceptibility to frost heaving of the Blackwell soil; and steepness of slope of the Carioca soil. Roads should be located, if possible, in less sloping areas of the Macareeno or Carioca soils to minimize cutting and filling and to reduce erosion. An adequate wearing surface is needed. Drainage should be provided.

The Macareeno soil is in capability subclass VIIw, nonirrigated. The Blackwell soil is in capability subclass VIw, nonirrigated. The Carioca soil is in capability subclass VIIs, nonirrigated.

1490—Arzo-Indiano-Barnard association. This map unit is on uplands and alluvial terraces. Elevation is 4,800 to 5,600 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 80 to 100 days.

This map unit is 35 percent Arzo very stony loam, 8 to 30 percent slopes; 25 percent Indiano stony loam, 15 to 30 percent slopes; and 25 percent Barnard stony sandy loam, 2 to 4 percent slopes. The Arzo soil is on pediments and lower colluvial slopes on foothills. The Indiano soil is on slightly concave slopes on foothills. The Barnard soil is on terraces.

Included in this unit are Risley soils on west- and south-facing upland slopes, Holbrook soils along drainageways, Cassiro soils on high alluvial fans, and Trosi soils on terrace remnants. The unit is about 4 percent Risley soils, 4 percent Holbrook soils, 4 percent Cassiro soils, and 3 percent Trosi soils.

The Arzo soil is moderately deep and well drained. It formed in alluvium and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 25 inches thick. The substratum is yellowish brown gravelly loam about 8 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Arzo soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Indiano soil is moderately deep and well drained. It formed in residuum dominantly of metavolcanic rock. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 13 inches thick. The subsoil is yellowish brown clay loam about 20 inches thick. Weathered metavolcanic rock is at a depth of 33 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Indiano soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Barnard soil is moderately deep and well drained. It formed in alluvium and pedisediments from mixed rock. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is grayish brown stony sandy loam about 15 inches thick. The subsoil is light yellowish brown clay about 11 inches thick above the hardpan. Depth to the hardpan ranges from 20 to 30 inches. Below the hardpan is gravelly and cobbly alluvium.

Permeability of the Barnard soil is slow. Available water capacity is low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Arzo soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout the area. The production of forage is limited by moderately low precipitation, moderate

available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor, mainly because of the large stones on the surface and the steepness of slope.

The present vegetation in most areas of the Indiano soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout the area. The production of forage is limited by moderately low precipitation, moderate available water capacity, and the restricted depth of the root zone over bedrock. The rating is poor for rangeland seeding because of the moderately low precipitation and steepness of slope.

The present vegetation in most areas of the Barnard soil is mainly big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout the area. The production of forage is limited by moderately low precipitation, low available water capacity, and the restricted depth of the root zone over the hardpan. The suitability of this soil for rangeland seeding is fair. The main limitations for seeding are moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from erosion.

The main limitations to use of the unit as sites for roads are steepness of slope of the Arzo and Indiano soils and low strength and high clay content of the Arzo and Barnard soils. Suitable base material and an adequate wearing surface are needed. If possible, roads should be located in less sloping areas to minimize cutting and filling and to reduce erosion.

The Arzo soil is in capability subclass VIIs, nonirrigated. The Indiano soil is in capability subclass VIIe, nonirrigated. The Barnard soil is in capability subclass VIs, nonirrigated.

1510—Cagle-Nosrac-Old Camp association. This map unit is on uplands. Elevation is 5,000 to 7,000 feet. The average annual precipitation is 8 to 14 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 80 to 100 days.

This unit is 35 percent Cagle very stony clay loam, 15 to 30 percent slopes; 30 percent Nosrac stony clay loam, 30 to 50 percent slopes; and 20 percent Old Camp extremely stony sandy loam, 30 to 50 percent slopes. The Nosrac soil is on east- and north-facing slopes. The Cagle soil is on colluvial slopes near drainageways. The Old Camp soil is on ridges.

Included in this map unit are Risley soils on south-facing slopes, Indiano soils on smooth west-facing slopes and rounded crests, Burnborough soils on colluvial slopes at high elevations, and Rock outcrop on peaks. The map unit is about 5 percent Risley soils, 3 percent Indiano soils, 3 percent Burnborough soils, and 4 percent Rock outcrop.

The Cagle soil is moderately deep and well drained. It formed in residuum and colluvium dominantly of andesite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony clay loam about 2 inches thick. The subsoil, about 37 inches thick, is brown and pale brown and averages gravelly clay. Highly weathered andesite is at a depth of 39 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Nosrac soil is very deep and well drained. It formed in residuum and colluvium dominantly of andesite. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is brown stony clay loam about 14 inches thick. The subsoil is light yellowish brown very gravelly clay loam about 24 inches thick. The substratum is light yellowish brown very gravelly clay loam to a depth of 60 inches.

Permeability of the Nosrac soil is moderately slow. Available water capacity is moderate. Effective rooting depth is more than 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Old Camp soil is shallow and well drained. It formed in residuum dominantly of volcanic rock. Slopes are 30 to 50 percent. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is pale brown extremely stony sandy loam about 2 inches thick. The subsoil is brown very cobbly clay loam and very stony sandy clay loam about 12 inches thick. Hard andesite is at a depth of 14 inches. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Old Camp soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Cagle soil is mainly western juniper and pinyon with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. The rating is poor for rangeland seeding because of the steepness of slope, large stones on the surface, and the restricted depth of the root zone over bedrock. If this soil is used as woodland, a mature stand

of trees 80 to 100 years old yields about 3 to 6 cords of wood per acre.

The present vegetation in most areas of the Nosrac soil is mainly big sagebrush, antelope bitterbrush, and basin wildrye. The production of forage is limited by moderate available water capacity. The rating is poor for rangeland seeding because of the steepness of slope.

The present vegetation in most areas of the Old Camp soil is mainly big sagebrush, green ephedra, and cheatgrass. The production of forage is limited by low precipitation, very low available water capacity, and the restricted depth of the root zone over bedrock. The rating is poor for rangeland seeding because of the very low available water capacity, steepness of slope, large stones on the surface, and the restricted depth of the root zone over bedrock.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope of the Nosrac soil, depth to bedrock, steepness of slope, and stoniness of the Old Camp soil, and steepness of slope and high clay content of the Cagle soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. An adequate wearing surface is needed. Deep cuts should be avoided on the Old Camp soil because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1520—Duco-Smallcone-Cagle association. This map unit is on mountainous uplands. Elevation is 4,200 to 7,800 feet. The average annual precipitation is 8 to 16 inches, the average annual air temperature is 47 to 48 degrees, and the average frost-free period is 80 to 110 days.

This unit is 40 percent Duco very stony sandy loam, 15 to 50 percent slopes; 30 percent Smallcone very gravelly coarse sandy loam, 15 to 50 percent slopes; and 15 percent Cagle very stony clay loam, 15 to 30 percent slopes. The Duco soil is on ridges and on north- and west-facing slopes adjacent to ridges. The Smallcone soil is on eroded side slopes on west- , north- and south-facing slopes. The Cagle soil is on lower slopes.

Included in this map unit are Indiano soils on concave east-facing slopes, Koontz soils on shoulders of rounded ridges, Waspo soils in shallow depressions, and Rock outcrop. The unit is about 5 percent Indiano soils, 3 percent Koontz soils, 2 percent Waspo soils, and 5 percent Rock outcrop.

The Duco soil is shallow and well drained. It formed in residuum mainly of andesite. Typically, 5 to 15 percent of the surface is covered with stones and some cobbles. The surface layer is grayish brown very stony sandy loam about 5 inches thick. The subsoil is brown very gravelly clay loam about 14 inches thick. Depth to hard bedrock ranges from 10 to 20 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Smallcone soil is very shallow and well drained. It formed in residuum of weathered andesite. Typically, 50 percent of the surface is covered with gravel. The surface layer is very pale brown very gravelly coarse sandy loam about 6 inches thick. Depth to soft bedrock ranges from 4 to 10 inches.

Permeability of the Smallcone soil is rapid. Available water capacity is very low. Effective rooting depth is 4 to 10 inches. Runoff is medium, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Cagle soil is moderately deep and well drained. It formed in residuum and colluvium of andesite. Typically, 5 to 15 percent of the surface is covered with stones and some cobbles. The surface layer is grayish brown very stony clay loam about 2 inches thick. The subsoil, about 37 inches thick, is dark grayish brown gravelly clay on the average. Depth to soft, weathered bedrock ranges from 20 to 40 inches.

Permeability of the Cagle soil is slow. Available water capacity is low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as woodland and rangeland.

The present vegetation in most areas of the Duco soil is mainly western juniper with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by very low available water capacity, the restricted depth of the root zone over bedrock, and plant competition. The rating is very poor for rangeland seeding because of the very low available water capacity of the surface layer, steepness of slope, and the restricted depth of the root zone over bedrock. If this soil is used as woodland, a mature stand of trees 80 to 100 years old yields about 4 to 8 cords of wood per acre. Grazing should be delayed until the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The present vegetation on the Smallcone soil in most areas is mainly a very sparse stand of Jeffrey pine with a sparse understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of merchantable timber is very low and natural regeneration of trees is difficult because of marginal precipitation, shallowness of soil, and plant competition. If woodland is to be maintained, only selective harvesting should be

practiced. Management that minimizes the risk of erosion is essential. The steepness of slope limits the kind of equipment that can be used in forest management.

The present vegetation in most areas of the Cagle soil is mainly western juniper and pinyon with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by moderately low precipitation, low available water capacity, and the restricted depth of the root zone over bedrock. The rating is very poor for rangeland seeding because of the steepness of slope. If this soil is used as woodland, a mature stand of trees 80 to 100 years old yields about 3 to 6 cords of wood per acre.

Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are the steepness of slope and depth to bedrock of the Duco soil, high clay content and steepness of slope of the Cagle soil, and steepness of slope of the Smallcone soil. Roads should be provided with suitable base material and an adequate wearing surface. If possible, they should be located in less sloping areas to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided in the Duco soil because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1521—Duco-Yuko-Lemm association. This map unit is on uplands. Elevation is 4,400 to 7,200 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 85 to 110 days.

This unit is 40 percent Duco very stony sandy loam, 15 to 50 percent slopes; 30 percent Yuko very stony loam, 15 to 50 percent slopes; and 15 percent Lemm very stony sandy loam, 15 to 30 percent slopes. The Duco soil is on east- and north-facing slopes and on high ridges. The Yuko soil is on south- and west-facing slopes. The Lemm soil is on colluvial slopes and short alluvial fans.

Included in this unit are Mizel soils on eroded south-facing slopes, Pahrange soils on saddles between peaks, Tristan soils on north-facing concave slopes at higher elevations, and Rock outcrop on peaks. The unit is about 5 percent Mizel soils, 3 percent Pahrange soils, 3 percent Tristan soils, and 4 percent Rock outcrop.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 5 inches thick. The subsoil is brown very cobbly clay loam about 14 inches thick. Bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Yuko soil is very shallow and well drained. It formed in residuum mainly from volcanic rock. Typically, 3 to 15 percent of the surface is covered with stones and some cobbles. The surface layer is brown very stony loam about 2 inches thick. The subsoil is yellowish brown silty clay loam about 6 inches thick. Highly weathered andesitic bedrock is at a depth of 8 inches. Depth to bedrock ranges from 6 to 14 inches.

Permeability of the Yuko soil is moderately slow. Available water capacity is very low. Effective rooting depth is 6 to 14 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Lemm soil is very deep and well drained. It formed in alluvium mainly from granitic rocks or rhyolite. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 19 inches thick. The subsoil is pale brown very gravelly coarse sandy loam about 21 inches thick. The substratum is very pale brown very gravelly loamy coarse sand to a depth of 60 inches.

Permeability of the Lemm soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of prolonged high intensity.

This unit is used as rangeland.

The present vegetation in most areas of the Duco soil is mainly western juniper and pinyon with an understory of big sagebrush and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity, the shallowness of the root zone over bedrock, and by competition of the trees. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity of the surface layer, steepness of slope, and the shallowness of the root zone. Where this unit is used as woodland, a mature stand of trees 80 to 100 years will yield about 4 to 8 cords of wood per acre.

The present vegetation in most areas of the Yuko soil is mainly big sagebrush, Anderson peachbrush, and green ephedra. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low available water capacity, steepness of slope, and the shallowness of the root zone.

The present vegetation in most areas of the Lemm soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation and low available water capacity. The suitability of this soil for

rangeland seeding is very poor because the available water capacity of the surface layer is very low.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this soil as sites for roads are the steepness of slopes of all three soils and shallowness over bedrock of the Duco soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1522—Duco-Pahrange-Lemm association. This map unit is on uplands. Elevation is 4,400 to 7,200 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 80 to 100 days.

This unit is 40 percent Duco very stony sandy loam, 15 to 50 percent slopes; 30 percent Pahrange very stony sandy loam, 30 to 70 percent slopes; and 15 percent Lemm very stony sandy loam, 15 to 30 percent slopes. The Duco soil is on ridges. The Pahrange soil is on saddles between peaks and on smooth slopes between ridges and gullies. The Lemm soil is on colluvial slopes near drainageways and on short alluvial fans.

Included in this unit are Flex soils on lower south-facing ridges, Mizel soils on eroded south-facing slopes, Tristan soils on north-facing concave slopes in snow pockets, and Rock outcrop on peaks. The unit is about 5 percent Flex soils, 3 percent Mizel soils, 3 percent Tristan soils, and 4 percent Rock outcrop.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 5 inches thick. The subsoil is brown very cobbly clay loam about 14 inches thick. Bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Pahrange soil is moderately deep and well drained. It formed in residuum and colluvium mainly from rhyolite. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 11 inches thick. The subsoil is brownish yellow gravelly clay loam about 15 inches thick over highly weathered bedrock. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Pahrange soil is moderately slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Lemm soil is very deep and well drained. It formed in alluvium mainly from granitic rocks or rhyolite. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony sandy loam about 19 inches thick. The subsoil is pale brown very gravelly coarse sandy loam about 21 inches thick. The substratum is very pale brown very gravelly loamy coarse sand to a depth of 60 inches.

Permeability of the Lemm soil is moderately rapid. Available water capacity of the soil is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of prolonged high intensity.

This unit is used as rangeland.

The present vegetation in most areas of the Duco soil is mainly western juniper with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity, the shallowness of the root zone over bedrock, and competition of the trees. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity of the surface layer, steepness of slopes, and the shallowness of the root zone. Where this unit is used as woodland, a mature stand of trees 80 to 100 years will yield about 4 to 8 cords of wood per acre.

The present vegetation in most areas of the Pahrange soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The production of forage is limited by the low precipitation, the very low available water capacity, and the restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the steepness of slopes.

The present vegetation in most areas of the Lemm soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation and the low available water capacity of the soil. The suitability of this soil for rangeland seeding is very poor because the available water capacity of the surface layer is very low.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope of all three soils and restricted depth over bedrock of the Duco soil. Roads

should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1530—Bombadil-Hefed-Rubble land association. This map unit is on uplands. Elevation is 4,400 to 7,000 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 47 to 50 degrees F, and the average frost-free period is 80 to 100 days.

This unit is 45 percent Bombadil very stony sandy loam, 15 to 50 percent slopes; 35 percent Hefed very stony sandy loam, 30 to 70 percent slopes; and 10 percent Rubble land. The Bombadil soil is on rounded tops and ridges and on slightly convex side slopes. The Hefed soil is on colluvial slopes near ravines and steep gullies. Rubble land is rock screes.

Included in this unit are Fireball soils on south-facing colluvial slopes, Singatse soils on south- and west-facing eroded ridges, Tristan soils on concave north-facing slopes at higher elevations, and Rock outcrop on peaks. The unit is about 4 percent Fireball soils, 2 percent Singatse soils, 2 percent Tristan soils, and 2 percent Rock outcrop.

The Bombadil soil is very shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 4 inches thick. The subsoil is brown gravelly loam about 9 inches thick. Fractured hard bedrock is at a depth of 13 inches. Depth to hard bedrock ranges from 7 to 14 inches.

Permeability of the Bombadil soil is moderately slow. Available water capacity is very low. Effective rooting depth is 7 to 14 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Hefed soil is very deep and well drained. It formed in colluvium derived dominantly from metavolcanic rocks. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 2 inches thick. The subsoil is brown very gravelly sandy loam about 11 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified very cobbly sandy loam to very gravelly loamy sand.

Permeability of the Hefed soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium to rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

Rubble land consists of cobble- and stone-size angular fragments of basaltic and metavolcanic rocks. It occurs as screes on steep hillsides.

This unit is used as rangeland.

The present vegetation in most areas of the Bombadil soil is mainly big sagebrush, spiny hopsage, and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity, steepness of slope, and the shallowness of the root zone.

The present vegetation in most areas of the Hefed soil is mainly big sagebrush, green ephedra, and bottlebrush squirreltail. The production of forage is limited by the low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are steepness of slope of both soils and shallowness over bedrock of the Bombadil soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1531—Bombadil-Hefed-Fireball association. This map unit is on uplands. Elevation is 4,400 to 6,000 feet. The average annual precipitation is 7 to 9 inches, the average annual temperature is 50 to 52 degrees F, and the average frost-free period is 90 to 110 days.

This unit is 35 percent Bombadil very stony sandy loam, 15 to 50 percent slopes; 30 percent Hefed very stony sandy loam, 15 to 50 percent slopes; and 20 percent Fireball extremely stony fine sandy loam, 30 to 50 percent slopes. The Bombadil soil is on ridges and near Rock outcrop. The Hefed soil is on lower, colluvial, north- and east-facing slopes. The Fireball soil is on slightly concave south-facing slopes near drainageways.

Included in this unit are Osobb soils on south-facing slopes; Rock outcrop as ridges and peaks; Mizel soils on rounded tops and ridges; and Xman soils, which are 10 to 20 inches thick over bedrock, on north- and east-facing slopes near ridgetops. The unit is about 3 percent Osobb soils, 5 percent Rock outcrop, 3 percent Mizel soils, and 4 percent Xman soils.

The Bombadil soil is very shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 4 inches thick. The subsoil is brown gravelly loam about 9 inches thick.

Fractured hard bedrock is at a depth of 13 inches. Depth to hard bedrock ranges from 7 to 14 inches.

Permeability of the Bombadil soil is moderately slow. Available water capacity is very low. Effective rooting depth is 7 to 14 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Hefed soil is very deep and well drained. It formed in colluvium derived dominantly from metavolcanic rocks. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is pale brown very stony sandy loam about 2 inches thick. The subsoil is brown very gravelly sandy loam about 11 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified very cobbly sandy loam to very gravelly loamy sand.

Permeability of the Hefed soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Fireball soil is deep and well drained. It formed in residuum derived dominantly from basaltic rocks. Typically, 15 to 25 percent of the surface is covered with stones. The surface layer is light brownish gray extremely stony fine sandy loam about 3 inches thick. The subsoil is light yellowish brown very cobbly loam about 21 inches thick. The substratum is white extremely cobbly loam about 23 inches thick over hard basalt bedrock. Depth to hard basalt bedrock ranges from 40 to 60 inches.

Permeability of the Fireball soil is moderate. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Bombadil soil is mainly big sagebrush, spiny hopsage, and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity, steepness of slope, and shallowness of the root zone.

The present vegetation in most areas of the Hefed soil is mainly big sagebrush, green ephedra, and bottlebrush squirreltail. The production of forage is limited by low precipitation. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope.

The present vegetation in most areas of the Fireball soil is mainly Bailey greasewood, shadscale, and bud sagebrush. The production of forage is limited by the very low precipitation. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation, steepness of slope, and large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are the steepness of slope of all three soils and restricted depth to bedrock of the Bombadil soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1540—McQuarrie-Tristan-Arzo association. This map unit is on uplands. Elevation is 4,600 to 7,000 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 44 to 50 degrees F, and the average frost-free period is 80 to 110 days.

This unit is 40 percent McQuarrie very stony sandy loam, 15 to 50 percent slopes; 30 percent Tristan very stony loam, 15 to 50 percent slopes; and 15 percent Arzo very stony loam, 8 to 30 percent slopes. The McQuarrie soil is near ridges and peaks and on smooth and slightly convex side slopes. The Tristan soil is on convex north- and east-facing slopes. The Arzo soil is on colluvial slopes and on foothills.

Included in this unit are Barshaad soils on plateau remnants, Softscrabble soils on north- and east-facing slopes at higher elevations in snow pockets, Old Camp soils on west- and south-facing ridges, Duco soils on east- and north-facing ridges, and Rock outcrop on peaks. The unit is about 3 percent Barshaad soils, 3 percent Softscrabble soils, 3 percent Old Camp soils, 3 percent Duco soils, and 3 percent Rock outcrop.

The McQuarrie soil is shallow and well drained. It formed in residuum mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 1 inch thick. The upper part of the subsoil is brown clay loam about 7 inches thick. The lower part of the subsoil is pale brown cobbly clay loam about 10 inches thick over hard bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the McQuarrie soil is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Tristan soil is deep and well drained. It formed in residuum and colluvium derived mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony loam about 7 inches thick. The upper part of the subsoil is brown very gravelly clay loam about 21 inches thick. The lower part of the subsoil is brown extremely cobbly loam

about 21 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Tristan soil is moderately slow. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

The Arzo soil is moderately deep and well drained. It formed in alluvium and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 25 inches thick. The substratum is yellowish brown gravelly loam about 8 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Arzo soil is slow. Available water capacity is moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the McQuarrie soil is mainly big sagebrush, antelope bitterbrush, Indian ricegrass, and western juniper. The production of forage is limited by the moderately low precipitation, very low available water capacity, and shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity, steepness of slope, and shallowness of the root zone.

The present vegetation in most areas of the Tristan soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope and large stones on the surface.

The present vegetation in most areas of the Arzo soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation, moderate available water capacity, and restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor because of the steepness of slope.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope of all the soils and the shallowness over bedrock of the McQuarrie soil, low load-bearing strength and high shrink-swell potential of the Arzo soil, and stones of the Tristan soil. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the restricted depth to bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1541—McQuarrie-Duco-Tristan association. This map unit is on uplands. Elevation is 5,500 to 7,200 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 44 to 49 degrees F, and the average frost-free period is 80 to 100 days.

This unit is 30 percent McQuarrie very stony sandy loam, 15 to 50 percent slopes; 30 percent Duco very stony sandy loam, 15 to 50 percent slopes; and 25 percent Tristan very stony loam, 15 to 50 percent slopes. The McQuarrie soil is on smooth slopes between ridges and steep gullies. The Duco soil is on ridges and peaks. The Tristan soil is on concave north- and east-facing slopes.

Included in this unit are Nosrac soils on colluvial slopes near drainageways, Softscrabble soils on concave north- and east-facing slopes at higher elevations in snow pockets, Old Camp soils on south-facing ridges at lower elevations, Barshaad soils on plateau remnants, and Rock outcrop on peaks. The unit is about 3 percent Nosrac soils, 3 percent Softscrabble soils, 3 percent Old Camp soils, 3 percent Barshaad soils, and 3 percent Rock outcrop.

The McQuarrie soil is shallow and well drained. It formed in residuum mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 3 inches thick. The upper part of the subsoil is brown clay loam about 6 inches thick. The lower part of the subsoil is pale brown cobbly clay loam about 4 inches thick over hard bedrock. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the McQuarrie soil is moderate. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Duco soil is shallow and well drained. It formed in residuum derived dominantly from rhyolite. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 5 inches thick. The subsoil is brown very cobbly clay loam about 14 inches thick. Bedrock is at a depth of 19 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Duco soil is moderately slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard

of water erosion is high. The hazard of soil blowing is slight.

The Tristan soil is deep and well drained. It formed in residuum and colluvium mainly from basalt. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony loam about 7 inches thick. The upper part of the subsoil is brown very gravelly clay loam about 21 inches thick. The lower part of the subsoil is brown extremely cobbly loam about 21 inches thick over weathered bedrock. Depth to weathered bedrock ranges from 40 to 60 inches.

Permeability of the Tristan soil is moderately slow. Available water capacity is low. Effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the McQuarrie soil is mainly big sagebrush, antelope bitterbrush, Indian ricegrass, and western juniper. The production of forage is limited by the moderately low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity, steepness of slope, and shallowness of the root zone.

The present vegetation in most areas of the Duco soil is mainly western juniper with an understory of big sagebrush, antelope bitterbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity, shallowness of the root zone over bedrock, and competition of the trees. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity, steepness of slope, and shallowness of the root zone. If this unit is used as woodland, a mature stand of trees 80 to 100 years yields about 4 to 8 cords of wood per acre.

The present vegetation in most areas of the Tristan soil is mainly big sagebrush, antelope bitterbrush, and Thurber needlegrass. A small amount of juniper is dispersed throughout. The production of forage is limited by the moderately low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is very poor because of the steepness of slope and large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the steepness of slope and shallowness over bedrock of the McQuarrie and Duco soils, and steepness of slope and stones of the Tristan soil. Suitable material should be added to provide an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1550—Skedaddle-Pahrange-Lemm association. This map unit is on uplands. Elevation is 4,400 to 7,000 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 80 to 110 days.

This unit is 35 percent Skedaddle very stony loam, 15 to 70 percent slopes; 30 percent Pahrange very stony sandy loam, 15 to 50 percent slopes; and 20 percent Lemm very stony sandy loam, 15 to 30 percent slopes. The Skedaddle soil is on eroded south- and east-facing slopes and near ridges. The Pahrange soil is on smooth slopes and on saddles. The Lemm soil is on colluvial slopes near drainageways and on short alluvial fans.

Included in this unit are Flex soils on rounded south- and west-facing ridges; Duco soils on north- and east-facing ridges at higher elevations; Zephan soils on tilted plateau remnants; Mizel soils on rounded, eroded hilltops; and Rock outcrop as rims and peaks. The unit is about 3 percent Flex soils, 3 percent Duco soils, 3 percent Zephan soils, 3 percent Mizel soils, and 3 percent Rock outcrop.

The Skedaddle soil is very shallow and well drained. It formed in residuum derived dominantly from metavolcanic rock. Slope is 15 to 70 percent. Typically, 3 to 5 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 8 inches thick. Weathered bedrock is at a depth of 8 inches and is about 3 inches thick. Depth to hard bedrock ranges from 4 to 12 inches.

Permeability of the Skedaddle soil is moderate. Available water capacity is very low. Effective rooting depth is 4 to 12 inches. Runoff is medium to rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Pahrange soil is moderately deep and well drained. It formed in residuum and colluvium mainly from rhyolite. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is brown very stony sandy loam about 11 inches thick. The subsoil is brownish yellow gravelly clay loam about 15 inches thick over highly weathered bedrock. Depth to weathered bedrock ranges from 20 to 40 inches.

Permeability of the Pahrange soil is moderately slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Lemm soil is very deep and well drained. It formed in alluvium mainly from granitic rock or rhyolite. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is grayish brown very stony

sandy loam about 19 inches thick. The subsoil is pale brown very gravelly coarse sandy loam about 21 inches thick. The substratum is very pale brown very gravelly loamy coarse sand to a depth of 60 inches.

Permeability of the Lemm soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Skedaddle soil is mainly big sagebrush, green ephedra, and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity of the surface layer, steepness of slope, large stones on the surface, and the shallowness of the root zone.

The present vegetation in most areas of the Pahrange soil is mainly low sagebrush, Thurber needlegrass, and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor, mainly because of the steepness of slope.

The present vegetation in most areas of the Lemm soil is mainly big sagebrush, littleleaf horsebrush, and bottlebrush squirreltail. The production of forage is limited by the moderately low precipitation and low available water capacity. The suitability of this soil for rangeland seeding is poor, mainly because of the steepness of slope and large stones on the surface.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure.

The main limitations to use of this unit as sites for roads are the steepness of slope of all these soils and depth to bedrock of the Skedaddle soil. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1570—Bluewing-Biddleman-Bundorf association. This map unit is on alluvial fans and terraces. Elevation is 4,000 to 4,400 feet. The average annual precipitation is 4 to 8 inches, the average annual air temperature is 48 to 53 degrees F, and the average frost-free period is 90 to 120 days.

This unit is 40 percent Bluewing very stony loamy sand, 2 to 8 percent slopes; 30 percent Biddleman gravelly sandy loam, 0 to 15 percent slopes; and 15 percent Bundorf very stony loam, 4 to 8 percent slopes. The Bluewing soil is on alluvial fans near the mouths of canyons and along drainageways. The Biddleman soil is on lower lake terraces. The Bundorf soil is on higher remnant terraces.

Included in this unit are Isolde soils on stabilized sand dunes, Stumble soils on alluvial fans of water-reworked eolian sand, and Trocken soils on inset alluvial fans. The unit is about 5 percent Isolde soils, 5 percent Stumble soils, and 5 percent Trocken soils.

The Bluewing soil is very deep and excessively drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is light brownish gray very stony loamy sand about 7 inches thick. The substratum to a depth of 60 inches or more is pale brown, stratified very gravelly loamy coarse sand and very gravelly sand.

Permeability of the Bluewing soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to occasional flash flooding during storms of high intensity.

The Biddleman soil is very deep and well drained. It formed in alluvium from mixed rock sources. Typically, the surface layer is light brownish gray gravelly sandy loam about 3 inches thick. The subsoil is pale brown gravelly loam about 5 inches thick. The substratum is light gray sand and gravel to a depth of 60 inches.

Permeability of the Biddleman soil is moderately slow. Available water capacity is very low. Effective rooting depth is more than 60 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

The Bundorf soil is shallow and well drained. It formed in alluvium derived from mixed rock sources. Typically, 3 to 15 percent of the surface is covered with stones. The surface layer is light gray very stony loam about 2 inches thick. The upper part of the subsoil is pale brown clay about 8 inches thick. The lower part is light brown very gravelly clay loam about 4 inches thick. The substratum is light yellowish brown very cobbly loam about 5 inches thick over an indurated hardpan. Depth to the hardpan ranges from 14 to 20 inches.

Permeability of the Bundorf soil is slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Bluewing soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the very low available water capacity.

The present vegetation in most areas of the Biddleman soil is mainly Bailey greasewood, shadscale, and Indian ricegrass. The production of forage is limited by very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and very low available water capacity.

The present vegetation in most areas of the Bundorf soil is mainly shadscale, bud sagebrush, and Indian ricegrass. The production of forage is limited by very low precipitation, very low available water capacity, and the shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor, mainly because of very low precipitation and the shallowness of the root zone over the hardpan.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

The main limitations to use of this unit as sites for roads are flooding on the Bluewing soil and the hardpan and the shrink-swell potential of the Bundorf soil. Roads should be located in areas of the Biddleman soil, if feasible.

The soils in this unit are in capability subclass VIIs, nonirrigated.

1580—Frodo-Xman-Oppio association. This map unit is on uplands. Elevation is 4,500 to 6,000 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is 48 to 50 degrees F, and the average frost-free period is 80 to 100 days.

This unit is 50 percent Frodo very stony loam, 2 to 8 percent slopes; 20 percent Xman very stony loam, 15 to 50 percent slopes; and 15 percent Oppio cobbly sandy loam, 4 to 15 percent slopes. The Frodo soil is on tilted plateaus and on pediments. The Xman soil is near rims and ridges and on steep back slopes. The Oppio soil is on smooth, slightly concave slopes.

Included in this unit are Manogue soils in shallow depressions, Barshaad soils on flat plateau remnants, Reywat soils on north- and east-facing ridges, and Rock outcrop on rims and peaks. The unit is about 5 percent Manogue soils, 3 percent Barshaad soils, 3 percent Reywat soils, and 4 percent Rock outcrop.

The Frodo soil is shallow and well drained. It formed in residuum and colluvium derived from volcanic rocks, mostly basalt. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is brown very stony loam about 6 inches thick. The subsoil is brown clay about 12 inches thick. A continuous, strongly cemented hardpan is at a depth of 18 inches. Depth to the hardpan ranges from 14 to 20 inches. Hard bedrock underlies the pan.

Permeability of the Frodo soil is slow. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

The Xman soil is shallow and well drained. It formed in residuum derived dominantly from volcanic rocks. Typically, 3 to 10 percent of the surface is covered with stones. The surface layer is grayish brown very stony loam about 2 inches thick. The subsoil is brown clay about 12 inches thick. Weathered, altered andesite is at a depth of 14 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Xman soil is slow. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is slight.

The Oppio soil is moderately deep and well drained. It formed in residuum derived dominantly from andesite and other volcanic rocks. Typically, 20 to 35 percent of the surface is covered with cobbles. The surface layer is light brownish gray cobbly sandy loam about 3 inches thick. The subsoil is brown clay about 18 inches thick. Hard, fractured bedrock is at a depth of 21 inches. Depth to bedrock ranges from 20 to 40 inches.

Permeability of the Oppio soil is slow. Available water capacity is very low. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as rangeland.

The present vegetation in most areas of the Frodo soil is mainly low sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail. The production of forage is limited by the very low available water capacity and the shallowness of the root zone over the hardpan. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity, large stones on the surface, and shallowness of the root zone.

The present vegetation in most areas of the Xman soil is mainly low sagebrush and bottlebrush squirreltail. The production of forage is limited by the low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low available water capacity, the shallowness of the root zone over bedrock, and steepness of slope.

The present vegetation in most areas of the Oppio soil is mainly low sagebrush and Douglas rabbitbrush. The production of forage is limited by the low precipitation, very low available water capacity, and restricted depth of the root zone over bedrock. The suitability of this soil for rangeland seeding is poor because of the low precipitation, very low available water capacity, and restricted depth of the root zone.

Steepness of slope limits access by livestock and promotes overgrazing of less sloping areas. Grazing should be delayed until the soil is firm and the more desirable plants have achieved sufficient growth to withstand grazing pressure. Livestock should be

managed so that enough vegetation is left to protect the unit from excessive erosion.

The main limitations to use of this unit as sites for roads are the shallowness over bedrock and low load-bearing strength of the Frodo soil; steepness of slope, low load-bearing strength, and high shrink-swell potential of the Xman soil; and low load-bearing strength and high shrink-swell potential of the Oppio soil. Suitable material should be added to provide a stable base and an adequate wearing surface. Roads should be located in less sloping areas, if feasible, to minimize cutting and filling and to reduce erosion. Deep cuts should be avoided because of the underlying bedrock.

The Oppio soil is in capability subclass VIs, nonirrigated. The Frodo and Xman soils are in capability subclass VIIs, nonirrigated.

1590—Ruhe stony loamy sand, 4 to 8 percent slopes. This shallow, well drained soil is on terraces. It formed in alluvium derived from mixed rock sources. Elevation is 4,000 to 4,400 feet. The average annual precipitation is 5 to 7 inches, the average air temperature is 50 to 52 degrees F, and the average frost-free period is 110 to 130 days.

Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is pale brown stony loamy sand 6 inches thick. The subsoil is light brownish gray gravelly loamy sand 8 inches thick. Lithoid tufa is at a depth of 14 inches and is about 21 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified very cobbly coarse sand to sand. Depth to lithoid tufa ranges from 14 to 20 inches.

Included in this unit are Isolde soils, which are very deep and occur on stabilized sand dunes; Trocken soils on lower alluvial fans; Stumble soils on alluvial fan skirts; Bluewing soils along drainageways; and Playas in shallow depressions. The unit is about 2 percent Isolde soils, 4 percent Trocken soils, 4 percent Stumble soils, 3 percent Bluewing soils, and 2 percent Playas.

Permeability of the Ruhe soil is rapid. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used as rangeland.

The present vegetation in most areas is mainly winterfat, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation, very low available water capacity of the surface layer, and shallowness of the root zone.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation.

Shallowness over bedrock and flooding are moderate limitations to use of this unit as sites for roads. Roads should be provided with drainage. Deep cuts should be avoided because of the underlying bedrock.

This unit is in capability subclass VIIs, nonirrigated.

1600—Wrango-Ruhe complex, 4 to 8 percent slopes. This map unit is on alluvial fans and terraces. Elevation is 3,900 to 5,600 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 48 to 51 degrees F, and the average frost-free period is 90 to 120 days.

This unit is 65 percent Wrango gravelly loamy sand, 4 to 8 percent slopes, and 20 percent Ruhe stony loamy sand, 4 to 8 percent slopes. The Wrango soil is on terraces and alluvial fans, and the Ruhe soil is on tufa terraces. Areas of these soils are so intricately intermingled that it is not practical to map them separately.

Included in this unit are Bluewing soils near drainageways; Stumble soils on alluvial fan skirts; Lithoid tufa, which occurs as Rock outcrop; and Beaches near lakes. The unit is about 5 percent Bluewing soils, 3 percent Stumble soils, 5 percent Rock outcrop, and 2 percent Beaches.

The Wrango soil is very deep and is excessively drained. It formed in alluvium derived from mixed rock sources. Typically, the surface layer is pale brown gravelly loamy sand about 2 inches thick. The upper 6 inches of the underlying material is pale brown gravelly sand. The lower part to a depth of 60 inches is light gray extremely gravelly loamy coarse sand.

Permeability of the Wrango soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash floods during storms of unusually high intensity.

The Ruhe soil is shallow and well drained. It formed in alluvium derived dominantly from mixed rock sources. Typically, 1 to 3 percent of the surface is covered with stones. The surface layer is pale brown stony loamy sand about 6 inches thick. The upper 8 inches of the underlying material is light brownish gray gravelly loamy sand. Lithoid tufa is at a depth of 14 inches and is about 21 inches thick. The underlying material to a depth of 60 inches is light brownish gray, stratified very cobbly coarse sand to sand. Depth to lithoid tufa ranges from 14 to 20 inches.

Permeability of the Ruhe soil is rapid. Available water capacity is very low. Effective rooting depth is 14 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. This soil is subject to flash flooding during storms of unusually high intensity.

This unit is used as rangeland.

The present vegetation in most areas of the Wrango soil is mainly spiny hopsage, big sagebrush, and Indian ricegrass. The production of forage is limited by the very low precipitation and very low available water capacity. The suitability of this soil for rangeland seeding is very poor, mainly because of the very low precipitation and the very low available water capacity of the surface layer.

The present vegetation in most areas of the Ruhe soil is mainly winterfat, shadscale, and Indian ricegrass. The production of forage is limited by the very low precipitation, very low available water capacity, and the shallowness of the root zone over bedrock. The suitability of this soil for rangeland seeding is very poor because of the very low precipitation, very low available water capacity of the surface layer, and shallowness of the root zone.

The duration and intensity of grazing should be adjusted to season of growth and to precipitation. To insure uniform grazing, salt blocks should be placed in less accessible areas rather than near water or in easily accessible areas.

The main limitations to the use of this soil as sites for roads are flooding and stones of the Wrango soil and shallowness over bedrock and flooding of the Ruhe soil. Roads should be provided with drainage. Suitable material should be added to provide an adequate wearing surface. Deep cuts should be avoided because of the underlying bedrock.

The soils in this unit are in capability subclass VIIs, nonirrigated.

Prime Farmland

Prime farmland, as defined by the U.S. Department of Agriculture, is that land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high crop yields if acceptable farming methods are used. Prime farmland produces the highest yields with minimal inputs of energy and money, and farming it results in the least damage to the environment. Prime farmland is of major importance in satisfying the nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and it should be used with wisdom and foresight.

Prime farmland is either currently used for producing food or fiber or is available for this use. Urban or built-up land or water areas are not considered prime farmland.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It has favorable temperature and growing season and acceptable reaction. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods or frequently flooded during the growing season. The slope ranges mainly from 0 to 4 percent.

About 30,000 acres, or about 3 percent of Washoe County, South Part, meets the soil requirements for prime farmland provided adequate irrigation water is available. Areas are scattered throughout the survey area, but most are in the central part. About 6,500 acres are presently irrigated.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to transportation, industrial, and urban uses. The loss of prime farmland to other uses results in more intensive use of marginal lands, which generally are more erodible, more droughty, more difficult to cultivate, and less productive.

The map units that make up prime farmland in Washoe County, Nevada, South Part are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The use and management of the soils are described in the section "Detailed Soil Map Units."

The map units that meet the soil requirements for prime farmland are:

130 Greenbrae sandy loam, clayey substratum, 0 to 2 percent slopes
131 Greenbrae sandy loam, 0 to 2 percent slopes
132 Greenbrae sandy loam, 2 to 4 percent slopes
200 Northmore sandy loam, 0 to 2 percent slopes
201 Northmore sandy loam, 2 to 4 percent slopes
445 Jubilee sandy loam, drained
460 Surprise loamy sand, 2 to 4 percent slopes
570 Turria loam
595 Springmeyer sandy clay loam, 0 to 2 percent slopes
600 Idlewild clay loam, drained
601 Idlewild sandy loam, drained
623 Orr sandy loam, 0 to 2 percent slopes
624 Orr gravelly sandy loam, 0 to 2 percent slopes
800 Truckee silt loam
810 Rose Creek fine sandy loam, drained
812 Rose Creek loamy fine sand, drained
813 Rose Creek gravelly fine sandy loam, drained
971 Aladshi sandy loam, 2 to 4 percent slopes
1040 Orr Variant gravelly sandy loam
1041 Orr Variant coarse sandy loam, thin surface
1130 Dithod sandy loam
1141 Bedell loamy sand, 2 to 4 percent slopes
1170 Wedertz sandy loam, 2 to 4 percent slopes
1300 Rose Creek Variant sandy loam
1301 Rose Creek Variant loamy fine sand

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Richard MacDougall, district conservationist, Soil Conservation Service, helped write this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

The goal of good cropland management is to produce the greatest amount of the most needed crops, while protecting and improving the soil. To achieve this goal, the land must be protected according to its needs and used within its capabilities. This can be done by using plants that are well suited to the soil, applying soil management practices that protect the soil, and keeping the soil in good condition.

In the following paragraphs, the principal soil management practices needed in the survey area are described generally. Although the soils in the area differ in management needs, certain practices apply to all the cultivated soils.

Conservation cropping systems involve growing crops in accordance with needed cultural and management practices. In a good conservation cropping system, the benefits gained from soil-improving crops and proper management practices more than offset the effects of soil-depleting crops.

Some soil-improving practices are using rotations that include grasses and legumes, returning crop residue to the soil, proper tillage, adequate fertilization, and weed and pest control. Several cropping systems are used in the survey area. A typical one is alfalfa for 8 to 10 years, small grain for 2 years, and then alfalfa with a protective nurse crop of oats. The crop residue from the small grain is returned to the soil. Minimum tillage is used.

Crop residue management is the use of plant residue left in cultivated fields to add organic matter and control erosion. Residue is incorporated into the soil or is left on the surface during the part of the year when erosion is likely to occur. The organic matter benefits the soil by improving soil tilth and structure. Organic matter functions mainly as it decomposes. Applying nitrogen fertilizer to the soil aids decomposition.

It is particularly important that organic matter be continuously returned to the soil. The easiest and most common way to add organic matter to the soil is to return residue from crops. Unless sufficient crop residue

is returned to the soil, the physical condition of the soil declines, the soil becomes compacted, and slower water infiltration and poorer aeration result.

Erosion control prevents the excessive wearing away of the land surface by wind and running water. Protecting the surface layer is important because the surface layer contains most of the organic matter and generally is more fertile than the subsoil. Wind erosion can be controlled by maintaining a cover of crop residue or living plants during the winter windy period, October 15 to April 15. Leveling the soil to the proper grade and applying water at the proper rate help to control water erosion on irrigated land.

Addition of plant nutrients. Most of the irrigated soils used for crops in this survey area respond well to liquid or solid fertilizer. The specific fertilizer needed depends on the crop grown and the nutrient content of the soil. Applying fertilizer that contains nitrogen and phosphorus increases yields for small grain and aids in establishing alfalfa. Sufficient phosphate for the life of the alfalfa stand should be added except where the soil contains enough available phosphorus. Manure adds some nitrogen, phosphate, and potassium to the soil and promotes good tilth. If barnyard manure is available, it can be used with good results before planting corn or small grain.

Irrigation water management is the application of irrigation water at rates and in amounts that insure high crop production and minimize soil and water losses. It is needed in all irrigated areas. Good irrigation is the application of water according to crop needs and soil characteristics.

Efficient delivery of water to farms is the first step in supplying the moisture needed for growing crops. A good distribution system has enough capacity to meet the needs of the crops to be irrigated, is located and controlled so that seepage losses are minimal, and carries the required flow safely.

An efficient system for transporting water to the individual fields on a farm or ranch is designed and constructed to carry the required flow without excessive seepage and erosion. Control structures are needed to facilitate the handling of water.

The design of an irrigation system is governed by the method of irrigation to be used, the amount of land leveling needed, and the desired efficiency in applying water.

To apply water efficiently, a farmer needs to know the available water capacity of the soil, the rate that water enters and moves through the soil, and the amount of water required by the crop. Most crops should be irrigated when 40 to 50 percent of the available moisture in the top half of the root zone has been used. A soil check can be made 2 days after irrigation to determine whether the desired amount of moisture was added. Except when reclaiming saline-alkali soils, applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid over-irrigating, leaching of plant nutrients, and aggravating any existing high water table condition.

Managing saline soils. Like most soils in arid and subarid regions, the soils in this survey area contain at least small quantities of soluble salts and alkali. Because rainfall is low and the rate of evaporation is high, percolating rainfall is insufficient to leach salts out of the root zone. In some soils, high concentrations of salts and alkali limit or prevent the growth of crops. In addition, many low-lying areas receive salty water from runoff or seepage. Surface evaporation of this water generally results in an increase of soluble salts on or in the soils. In some areas that have a high water table, water rises in the soil by capillary action and carries dissolved salts with it. The soluble salts are readily dissolved in water and can be moved to any part of the soil profile.

A soil that contains excessive amounts of soluble salts is called a saline soil. One that contains excessive amounts of adsorbed sodium is called an alkali soil. A soil that contains excessive amounts of both soluble salts and alkali is a saline-alkali soil.

Saline phases of several of the soils in the survey area have been mapped. The map unit name does not give the degree to which these soils are affected nor does it indicate whether the soils contain both salt and alkali. This information is given in the map unit description. In this survey area, three saline and alkali classes are used as soil phases.

Class 1 soils are free of excess salts and alkali. These soils contain less than 0.15 percent salts, and the conductivity of the saturation extract is less than 4 millimhos per centimeter at 25 degrees C. The content of exchangeable sodium is less than 15 percent.

Class 2 soils are slightly saline-alkali soils. These soils contain 0.15 to 0.35 percent salts, and the conductivity of the saturation extract is 4 to 8 millimhos per centimeter at 25 degrees C. The content of exchangeable sodium is 15 to 20 percent for soils of moderately coarse, medium, moderately fine, and fine texture.

Class 3 soils are strongly saline-alkali. These soils contain more than 0.65 percent salts, and the conductivity of the saturation extract is more than 16 millimhos per centimeter at 25 degrees C. The content of exchangeable sodium is more than 25 percent for soils of moderately coarse, medium, moderately fine, and fine texture.

Although there is a distinct gap between the second and third classes, an intermediate class is not needed in this survey area because only a very small percentage of the samples analyzed was moderately saline-alkali.

Some soils mapped as slightly saline-alkali are free of excess salts and alkali in the upper 4 or 5 inches, but they contain slight or moderate concentrations just below

the plow layer. Several soils mapped as strongly saline-alkali are only slightly affected in the plow layer.

Soils differ in the kinds of salt they contain and in the practices needed for improvement. For this reason, each soil requires individual treatment; however, some general guidelines can be given.

A good supply of irrigation water and adequate drainage must be provided to reclaim any soil in this survey area. The most common method of applying water for reclamation is to level the areas to a uniform grade and then to flood them between border dikes. If drainage is adequate and large amounts of water are used, this method is effective in leaching the soluble salts out of the root zone.

Proper pasture management is grazing pasture at a rate that maintains high-quality grasses and legumes. This can be accomplished by adjusting the stocking rates or season of use to allow maximum growth and survival of plants.

A common method of pasture management is to use several pastures in a rotation system that allows adequate regrowth in each. Livestock should be kept off the pastures when the soil is wet. Grazing when the pastures are wet results in compaction of the soil, a decrease in the rate of water intake, and destruction of soil structure. Pastures should be properly irrigated, and drainage should be provided. Increased yields can be obtained by applying commercial fertilizers and barnyard manure if it is available. Weeds generally can be controlled by mowing. Droppings of manure should be spread with a drag each spring.

Proper hayland management is the treatment and use of hayland to prolong the life of desirable forage plants, to maintain or improve the quality and quantity of the forage, to protect the soil, and to reduce water loss. Management includes the establishment and renovation of hayfields with long-term stands of adapted plants.

An important way to increase yields is to use adapted plants. To renovate and establish hayland, the plants selected should withstand climatic extremes and produce high yields during a relatively short growing season. High-quality, certified seed should be planted. Legume seeds should be inoculated. Land leveling and planing should be completed prior to preparing the seedbed. To control weeds, provide final smoothing, and control erosion, an annual crop should be grown for a year before reestablishing a forage crop. Seed can be drilled directly into the stubble of the annual crop.

Disease can be controlled by the use of resistant plants, crop rotation, and proper irrigation management.

Fertilization is essential to insure that growth is not limited. The amount needed depends on the properties of the soil and the plants grown.

The frequency and amount of irrigation water applied depends on the available water capacity of the soil and the rate of evapotranspiration.

Drainage is a major concern in some parts of this survey area. In some places where the water table has been lowered, the production of alfalfa hay, meadow hay, and pasture has been greatly increased.

The soils on some of the lower flood plains in the area have a fluctuating water table. Excessive irrigation has helped to raise the water table in some of the lower lying soils.

In soils that are inadequately drained, soluble salts and alkali accumulate, retarding or preventing the growth of crops. The inadequately drained soils are also poorly aerated, which reduces the growth of plants and increases their susceptibility to diseases.

Even in saline or alkali soils that are moderately well drained to well drained, a drainage system must be installed if the soils are to be reclaimed. For reclamation, large amounts of water must be used to leach the salts from the root zone and drains must be built to dispose of surface and subsurface water.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in the map unit descriptions. In any given year, yields may be higher or lower than those indicated because of variations in weather, length of growing season, and other climatic factors or damage from insects.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue and barnyard manure; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the map unit descriptions are grown in the survey area, but estimated yields are not listed because the acreage of such crops

is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Soils adjacent to the Reno-Sparks metropolitan area and the soils in outlying valleys that are rapidly urbanizing are not included in table 5 although these soils have small areas that still support native plants. Because of urbanization, range management decisions are site specific in this area. Onsite assistance can be obtained by contacting the local office of the Soil Conservation Service.

Table 5 shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as or are suited to use as rangeland are listed. Explanation of the column headings in table 5 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important. Detailed descriptions of the range sites are in the Technical Guide available at the local office of the Soil Conservation Serivce.

Total production is the amount of vegetation that can be expected to grow annually on well managed

rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre reduced to a common percent of air-dry moisture.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in range management is to manage grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of water erosion and soil blowing. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Woodland Management and Productivity

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Minimizing the risk of erosion is essential when harvesting timber. Proper design of road drainage systems and care in the placement of culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and sloughing. Excavation for roads increases the hazard of erosion. Access roads should be designed to provide adequate cut-slope grade. Drains are needed to control surface runoff and keep soil losses to a minimum.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is

expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants. After harvesting, reforestation should be managed to reduce competition from undesirable understory plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production. Selecting tree species that are adapted to the soil is important in reforestation, whether reforestation is done primarily to grow commercial forests or to reduce soil erosion.

Woodland Understory Vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland, if well managed, can produce enough understory vegetation to support grazing by livestock or wildlife, or by both, without damage to the trees. Careful management, however, is important when grazing by livestock is a planned use of woodland. Animals can trample and compact soil, injure shallow roots, and bruise tree seedlings and sprouts.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, hold snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 7 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 7 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet,

are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Fish and Wildlife Habitat

Norman Ritter, state resource conservationist, Soil Conservation Service, helped prepare this section.

Wildlife is a valuable resource in Washoe County. The rapid rate of urban development in the area increases the importance of improving and maintaining wildlife habitat.

Fish Habitat

Sport fishing is of considerable importance in the survey area. The Truckee River is the principal stream in the area and is heavily fished throughout the year. Smaller streams that rise on the flanks of the Sierras and a few small lakes also provide sport fishing.

These streams and small lakes support some natural reproduction. Fishing in Washoe County, however, depends mainly on annual stocking from state and federally-supported hatcheries. The rapid urbanization results in increases in both the number of people fishing the waters of the area and the amount of sediment and chemical pollutants entering the waters. Under these conditions, natural propagation is decreasing and hatchery stocking is becoming more important. As the physical habitat deteriorates, other fish of perhaps less desirable species may become dominant in the degraded waters.

The Nevada Department of Wildlife's Verdi Fish Hatchery on the Truckee River produces the Lahontan strain of cutthroat trout, a fish native to the survey area. The Pyramid Lake Indian tribe also operates a hatchery near Sutcliffe on the shores of Pyramid Lake. They specialize in propagating cutthroat trout and Cui-ui (lakesuckers), both of which have declined in numbers in recent years.

Several introduced game fish, such as brook and brown trout, have become established in the upper reaches of streams. Rainbow trout and whitefish also inhabit the cooler stream areas. The introduced Sacramento perch is becoming an important part of the Pyramid Lake fishery, especially during spring. The introduced carp have become established in the lower, warmer reaches of streams. Other warm-water fishes, such as largemouth bass, sunfish, and crappie, have been introduced into privately-owned ponds and storage reservoirs. These areas generally are not open to public fishing.

Terrestrial Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

Several kinds of soils and a combination of land uses are generally needed to provide all the habitat elements needed by a specific type of wildlife. For this reason, interpreting the Washoe County soils for specific wildlife uses can best be done by referring to the section "General Soil Map Units."

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are Sandberg bluegrass, Indian ricegrass, and globe mallow.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of

the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, fir, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountainmahogany, bitterbrush, snowberry, and big sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include quail, pheasant, meadowlark, field sparrow, and cottontail.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

In the following paragraphs, the general soil map units of the survey area are described as wildlife areas that differ in species potentially supported and in environmental factors.

Wildlife Area 1 is in general soil map unit 1. The soils in this area are nearly level and are on flood plains of the Truckee River and smaller streams. These soils provide suitable habitat for a wide variety of wildlife because of the amount of water available, the meadow vegetation and scattered patches of willows on the poorly drained soils, and the big sagebrush and basin wildrye on the better drained soils of minor extent.

Wildlife species in this area include mink, cottontail, shore birds, ducks, geese, valley quail, and muskrat. Most of the wildlife is dependent on the meadows and the shallow water areas, and management should be directed toward improving or maintaining these areas. In the cultivated areas, fence rows and ditchbanks can be planted with desirable plants to make a more attractive habitat for quail and other openland wildlife.

Wildlife Area 2 is in general soil map units 2 and 6. This area is in the valleys on low-lying alluvial fans and low terraces. The native vegetation is mostly big sagebrush and Indian ricegrass on the alluvial fans and black greasewood and basin wildrye on the salt- and alkali-affected terraces.

Wildlife species in this area include jackrabbit, cottontail, coyote, badger, weasel, magpie, crow, and valley quail. The habitat in this area can be enhanced by properly locating watering facilities. In cultivated areas, planting desirable plants along fence rows and ditchbanks provides a more attractive habitat for openland wildlife.

Wildlife Area 3 is in general soil map units 3, 4, 5, and 9. The soils in this area are dry. They are on alluvial fans, terraces, and foothills. The native vegetation is mostly shadscale, bud sagebrush, and Indian ricegrass.

Wildlife species in this area include a few jackrabbits, ravens, kangaroo rats, and rattlesnakes. Dryness limits the management of this area. The habitat can be improved by properly locating watering facilities.

Wildlife Area 4 is in general soil map units 7, 8, 10, 11, and 12. This area is on the higher lying alluvial fans and terraces, foothills, and low mountain areas. The native vegetation includes big sagebrush, bitterbrush, low sagebrush, and grasses. Some areas support pinyon and Utah juniper.

Wildlife species in this area include sage grouse, chukar, dove, vultures, Stellar jays, mule deer, antelope, and a few mountain lions. Proper grazing use is a good management practice in this area. The habitat in this area can be improved by properly locating watering facilities.

Wildlife Area 5 is in general soil map units 13 and 14. This area is on mountain slopes. The native vegetation is mostly big sagebrush, bitterbrush, low sagebrush, mountainmahogany, and grasses. Some areas support Jeffrey pine.

Wildlife species in this area include mule deer, marmot, ground squirrel, spruce grouse, mountain quail, and golden eagle. Small seeps and wet areas provide water for most of this area. Proper grazing use is a good management practice in this area.

Wildlife Area 6 is in general soil map units 15, 16, 17, and 18. This area is on higher mountains in the Carson Range. The native vegetation is mostly conifer trees. Some included soils support sagebrush-grass, wet

meadows, and areas of quaking aspen in snow pockets. These soils contribute significantly to the overall potential of the habitat, and good management is needed.

Wildlife species in this area include mule deer, black bear, mountain beaver, snowshoe hare, bandtailed pigeon, sparrow hawk, and the introduced Merriam turkey. The habitat in this area can be improved by proper watershed and timber management.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic

layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the

ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, and terraces and diversions.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

Soil and Water Features

Tables 15 and 16 give estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups, shown in table 15, are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An

artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. Only saturated zones within a depth of about 6 feet are indicated.

Depth to bedrock is given in table 16 if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Cemented pans are cemented or indurated subsurface layers within a depth of 5 feet. Such pans cause difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4, 17*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 17, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Aridisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Orthid (*Orth*, meaning truer, plus *id*, from Aridisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Camborthids (*Camb*, meaning change, plus *orthid*, the suborder of the Aridisols.

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Camborthids.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is sandy-skeletal, mixed, mesic Typic Camborthids.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*16*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*17*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Acrelane Series

The Acreland series consists of shallow, well drained soils on uplands. These soils formed in residuum derived from granodiorite. Slopes are 8 to 50 percent.

Typical pedon of Acrelane very stony sandy loam, in an area of Acrelane-Rock outcrop complex, 1,300 feet east and 600 feet south of the northwest corner of sec. 10, T. 20 N., R. 19 E.

A11—0 to 1 inch; brown (10YR 4/3) very stony sand, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine

interstitial pores; 50 percent fine pebbles, 5 percent cobbles, 5 percent stones; slightly acid; abrupt wavy boundary.

A12—1 to 3 inches; brown (10YR 5/3) gravelly loam, dark brown (7.5YR 3/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; few very fine and fine vesicular pores; 15 percent pebbles; slightly acid; clear wavy boundary.

B1—3 to 6 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark brown (7.5YR 3/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; few very fine interstitial pores; common thin clay coatings and bridges; 15 percent pebbles; neutral; clear wavy boundary.

B2t—6 to 10 inches; reddish brown (5YR 4/4) very gravelly sandy clay loam, yellowish red (5YR 4/6) moist; massive; hard, friable, sticky and plastic; common very fine roots; common very fine interstitial pores; many thin clay films in pores; 50 percent pebbles; neutral; abrupt wavy boundary.

C1r—10 to 60 inches; decomposed granodiorite that has fractures and cracks plugged with clay; can be dug with hand tools, but contains some hard masses of rock that are the size of boulders.

The thickness of the solum and the depth to weathered bedrock range from 10 to 20 inches. Reaction in the A1 horizon is medium acid to slightly acid. The Bt horizon is very gravelly sandy clay loam or very gravelly coarse sandy loam. Reaction in the B horizon is neutral or mildly alkaline. The B2t horizon is 18 to 30 percent clay and 35 to 60 percent gravel.

Aladshi Series

The Aladshi series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived from mixed rock. Slopes are 2 to 8 percent.

Typical pedon of Aladshi sandy loam, 2 to 4 percent slopes, 400 feet east and 1,700 feet north of the southwest corner of sec. 3, T. 22 N., R. 21 E.

A11—0 to 1 inch; brown (10YR 5/3) gravelly sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; few very fine roots; common very fine vesicular and interstitial pores; 15 percent pebbles; slightly acid; abrupt smooth boundary.

A12—1 to 5 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine vesicular pores and few very fine tubular pores; slightly acid; abrupt wavy boundary.

A13—5 to 7 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; slightly acid; abrupt wavy boundary.

B21t—7 to 12 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; weak medium prismatic and angular blocky structure; hard, friable, sticky and plastic; common very fine, fine, and medium roots; common very fine tubular pores; many thin clay films coating ped faces; 10 percent pebbles; neutral; clear wavy boundary.

B22t—12 to 23 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 4/4) moist; moderate fine prismatic and subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; common thin clay films on faces of peds and in pores, few moderately thick clay films on faces of peds; 15 percent pebbles; moderately alkaline; clear wavy boundary.

B3tca—23 to 34 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; few thin clay films bridging sand grains; common fine lime filaments or threads; 20 percent pebbles; moderately alkaline; clear wavy boundary.

IIC1si—34 to 44 inches; brown (7.5YR 5/4) weakly silica-cemented very gravelly loam, dark brown (7.5YR 4/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine tubular pores and common very fine interstitial pores; few thin clay films bridging sand grains; common fine lime filaments or threads; 55 percent pebbles; moderately alkaline; gradual wavy boundary.

IIIC2—44 to 60 inches; pinkish gray (7.5YR 6/2) extremely gravelly sandy loam, dark brown (7.5YR 4/2) moist; massive; hard, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores and common very fine interstitial pores; few fine lime filaments or threads; 65 percent pebbles; moderately alkaline.

The solum ranges from 20 to 34 inches in thickness. Reaction in the A1 horizon is slightly acid or neutral. The Bt horizon is sandy clay loam, loam, or gravelly loam that is 18 to 27 percent clay. It is 5 to 20 percent rock fragments. Reaction in the Bt horizon is neutral to moderately alkaline.

Apmat Series

The Apmat series consists of very deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium derived from mixed rock. Slopes are 2 to 8 percent.

Typical pedon of Apmat very stony coarse sand, 2 to 8 percent slopes, 2.600 feet east and 2,400 feet north of the southwest corner of sec. 10, T. 17 N., R. 19 E.

O—1 inch to 0; pine needle duff.

A11—0 to 5 inches; dark grayish brown (10YR 4/2) very stony coarse sand, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine to medium tubular pores; 5 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid; gradual smooth boundary.

A12—5 to 10 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine to medium tubular pores; 15 percent pebbles; slightly acid; clear smooth boundary.

A2—10 to 21 inches; light brownish gray (10YR 6/2) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine to coarse roots; many very fine to medium tubular pores; 30 percent pebbles, 5 percent cobbles; slightly acid; clear wavy boundary.

A&B—21 to 33 inches; pale brown (10YR 6/3) and light gray (2.5Y 7/2) very cobbly loamy coarse sand, dark brown (10YR 4/3) and grayish brown (2.5Y 5/2) moist; weak medium angular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine to coarse roots; few very fine and fine tubular pores; few moderately thick clay films on ped faces and in pores and bridging sand grains; 5 percent pebbles, 30 percent cobbles, 5 percent stones, all highly weathered; neutral; clear irregular boundary.

B2t—33 to 42 inches; yellowish brown (10YR 5/4) extremely stony coarse sandy loam, dark yellowish brown (10YR 4/4) moist, with a few seams that are grayish brown (2.5Y 5/2); massive; slightly hard, firm, sticky and slightly plastic; very few roots; very few pores; common moderately thick clay films in pores and bridging sand grains; 20 percent pebbles, 10 percent cobbles, 40 percent stones, all highly weathered; neutral; clear irregular boundary.

B3t—42 to 55 inches; yellowish brown (10YR 5/4) extremely stony coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive, slightly hard, firm, slightly sticky and slightly plastic; very few roots; very few pores; few thin clay films bridging sand grains; 5 percent pebbles, 10 percent cobbles, 50 percent stones, all highly weathered; neutral; clear irregular boundary.

C1—55 to 63 inches; pale brown (10YR 6/3) extremely bouldery loamy coarse sand, dark brown (10YR 4/3) moist; massive; soft, friable, nonsticky and nonplastic; 15 percent pebbles, 20 percent cobbles, 60 percent stones and boulders, all highly weathered; medium acid.

The solum ranges from 30 to 60 inches in thickness. Reaction in the profile is neutral to medium acid. The Bt horizon is loam or sandy loam that is 10 to 18 percent clay. It is 35 to 70 percent rock fragments.

Aquinas Series

The Aquinas series consists of moderately deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium derived mainly from granitic rocks. Slopes are 4 to 15 percent.

Typical pedon of Aquinas sandy loam, 4 to 8 percent slopes, 200 feet east and 500 feet south of the northwest corner of sec. 24, T. 21 N., R. 18 E.

A11—0 to 1 inch; pale brown (10YR 6/3) loamy coarse sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; many fine interstitial pores; medium acid; abrupt smooth boundary.

A12—1 to 7 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; slightly acid; abrupt wavy boundary.

B21t—7 to 17 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate, fine to medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine and fine roots; common fine tubular pores; many thin clay coatings and bridges on sand grains, and common thin and few moderately thick clay films on ped faces; slightly acid; clear wavy boundary.

B22t—17 to 29 inches; light brown (7.5YR 6/4) sandy clay loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, sticky and plastic; few very fine and fine roots; common fine tubular pores; many thin clay coatings and bridges on sand grains; slightly acid; clear wavy boundary.

B31t—29 to 34 inches; light brown (7.5YR 6/4) loamy coarse sand, brown (7.5YR 5/4) moist; massive; hard, friable, nonsticky and nonplastic; few micro and very fine roots; many very fine interstitial pores; common thin clay coatings and bridges; slightly acid; abrupt wavy boundary.

IIB32t—34 to 37 inches; light brown (7.5YR 6/4) clay, dark brown (7.5YR 4/4) moist; strong very fine to fine subangular blocky structure; very hard, friable, very sticky and very plastic; few micro and very fine roots; few micro and very fine tubular pores; many thin and few moderately thick clay films on ped faces; mildly alkaline; abrupt wavy boundary.

IIC1sim—37 to 40 inches; pinkish gray (7.5YR 6/2) strongly cemented duripan with reddish yellow (7.5YR 6/6) coatings in cracks, dark brown (7.5YR 4/4) moist; extremely hard, extremely firm; few micro and very fine roots in cracks; moderately alkaline; abrupt wavy boundary.

IIC2sicam—40 to 46 inches; light brownish gray (10YR 6/2) strongly silica-cemented duripan; extremely hard, extremely firm; strongly effervescent; moderately alkaline; clear wavy boundary.

IIIC3—46 to 62 inches; pale brown (10YR 6/3) stratified old loamy valley-fill deposits with lenses and blotches of very pale brown (10YR 8/3), brown (10YR 5/3) moist; strong thin platy structure; very hard, firm, nonsticky and nonplastic; strongly effervescent; moderately alkaline.

The solum thickness and the depth to the strongly cemented duripan range from 30 to 40 inches. Reaction in the A1 horizon is medium acid to slightly acid. The B2t horizon is sandy clay loam or clay loam that is 20 to 35 percent clay. The B2t is commonly medium acid to slightly acid but may range to mildly alkaline in the lower part. The IIIC3 material is mildly alkaline to moderately alkaline.

Arzo Series

The Arzo series consists of moderately deep, well drained soils that formed in alluvium and colluvium derived from basalt. These soils are on lower slopes. Slopes are 8 to 30 percent.

Typical pedon of Arzo very stony loam, in an area of Arzo-Indiano-Barnard association, 2,000 feet east and 700 feet south of the northwest corner of sec. 3, T. 24 N., R. 19 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, sticky and plastic; common coarse, medium, fine, and very fine roots; many fine and very fine tubular pores; 15 percent pebbles, 10 percent cobbles, 10 percent stones; neutral; clear smooth boundary.

B21t—2 to 7 inches; brown (7.5YR 4/2) gravelly clay, dark brown (7.5YR 3/2) moist; strong fine and medium prismatic structure parting to strong fine and medium angular blocky; very hard, friable, very sticky and very plastic; common very fine through medium roots; common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 15 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

B22t—7 to 18 inches; brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; strong coarse prismatic structure parting to strong medium and coarse angular blocky; very hard, friable, very sticky and very plastic; common very fine through coarse roots; common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; common slickensides; mildly alkaline; clear smooth boundary.

B3tca—18 to 27 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; strong coarse and medium angular blocky structure; very hard, very friable, sticky and plastic; common fine roots and few medium roots; few very fine tubular pores, common thin clay films on ped faces and in pores; slightly effervescent; moderately alkaline; abrupt wavy boundary.

C1ca—27 to 35 inches; yellowish brown (10YR 5/4) gravelly loam, dark brown (10YR 4/3) moist; massive; hard, firm, sticky and plastic; common fine roots and few medium roots; few very fine tubular pores; strongly effervescent, lime in seams and as soft masses; moderately alkaline; clear wavy boundary.

R—35 inches; weathered rock with lime and silica along cracks.

The depth to bedrock ranges from 20 to 40 inches. Reaction throughout the solum is neutral to moderately alkaline. The Bt horizon is clay or clay loam that is 35 to 45 percent clay.

Bango Series

The Bango series consists of very deep, well drained soils on low lake terraces. These soils formed in eolian and alluvium-modified lacustrine sediment derived from mixed rock. Slopes are 0 to 8 percent.

Typical pedon of Bango gravelly sandy loam, 0 to 8 percent slopes, 600 feet south and 1,000 feet east of the northwest corner of sec. 2, T. 22 N., R. 24 E.

A1—0 to 2 inches; light gray (10YR 7/2) gravelly sandy loam, brown (10YR 5/3) moist; moderate medium and thick platy structure; slightly hard, very friable, sticky and plastic; few very fine roots; common very fine and fine vesicular pores; 30 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

B2t—2 to 10 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; moderate coarse prismatic structure parting to weak thin platy; slightly hard, very friable, sticky and plastic; few very fine and fine tubular pores; 5 percent pebbles; slightly effervescent; moderately alkaline; clear smooth boundary.

C1ca—10 to 15 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, sticky and plastic; few fine roots; many very fine and fine interstitial and few very fine and

fine tubular pores; strongly effervescent; strongly alkaline; clear smooth boundary.

IIC2ca—15 to 21 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine and fine interstitial pores; strongly effervescent; strongly alkaline; abrupt smooth boundary.

IIIC3ca—21 to 30 inches; white (10YR 8/2) silt loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine tubular pores; violently effervescent; strongly alkaline; abrupt smooth boundary.

IIIC4ca—30 to 39 inches; white (10YR 8/2) silt loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; violently effervescent; strongly alkaline; abrupt smooth boundary.

IVC5—39 to 54 inches; very pale brown (10YR 7/4) very fine sand, yellowish brown (10YR 5/4) moist; single grained; loose, nonsticky and nonplastic; few fine roots; many very fine interstitial pores; moderately alkaline; abrupt smooth boundary.

VC6—54 to 66 inches; very pale brown (10YR 7/4) sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; many very fine interstitial pores; moderately alkaline.

The depth of the solum ranges from 6 to 10 inches. Reaction is moderately alkaline or strongly alkaline throughout the profile. The B2t horizon is loam or clay loam that is 20 to 30 percent clay.

Barnard Series

The Barnard series consists of moderately deep, well drained soils on pediment remnants and terraces. These soils formed in alluvium and pedisediment derived from mixed rock. Slopes are 2 to 4 percent.

Typical pedon of Barnard stony sandy loam, in an area of Barnard-Trosi association, 178 feet west and 178 feet south of the northeast corner of sec. 19, T. 19 N., R. 19 E.

A11—0 to 6 inches; grayish brown (10YR 5/2) stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many micro to medium roots; 5 percent pebbles, 5 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

A12—6 to 15 inches; grayish brown (10YR 5/2) stony sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak medium angular blocky structure; slightly hard, friable, sticky and plastic; many fine to medium roots; 5 percent pebbles, 5 percent cobbles, 5 percent stones; neutral; abrupt smooth boundary.

B2t—15 to 26 inches; light yellowish brown (10YR 6/4) clay, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure; very hard, firm, sticky and plastic; common very fine roots; many moderately thick clay films on ped faces; neutral; abrupt smooth boundary.

C1sim—26 to 29 inches; indurated silica-cemented hardpan; abrupt smooth boundary.

C2si—29 to 40 inches; interbedded ash and silts that are weakly cemented and highly compacted.

The thickness of the solum and the depth to the indurated pan range from 20 to 30 inches. The mollic epipedon is 7 to 17 inches thick. The B2t horizon is clay or silty clay loam that is 35 to 50 percent clay.

Barshaad Series

The Barshaad series consists of moderately deep, well-drained soils. These soils formed in residuum and colluvium derived from basalt. Barshaad soils are on plateau remnants, pediments, and ridgetops. Slopes are 2 to 15 percent.

Typical pedon of Barshaad very stony loam, in an area of Barshaad-Fugawee-Duckhill Variant association, 2,300 feet west and 2,300 feet south the northeast corner of sec. 29, T. 20 N., R. 18 E.

A1—0 to 1 inch; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak thin and medium platy structure parting to weak fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 10 percent pebbles, 5 percent cobbles, 5 percent stones; neutral; abrupt smooth boundary.

B21t—1 to 9 inches; brown (10YR 4/3) gravelly clay, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to strong medium angular blocky; hard, firm, sticky and very plastic; many very fine and medium roots; common very fine and medium tubular pores; 15 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

B22t—9 to 24 inches; yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 3/4) moist; moderate medium prismatic structure parting to strong medium angular blocky; hard, firm, sticky and very plastic; many very fine and medium roots; common very fine and medium tubular pores; 20 percent pebbles, 10 percent cobbles; neutral; abrupt wavy boundary.

R—24 inches; fractured and weathered basaltic rock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. Reaction throughout the profile is neutral to moderately alkaline.

The B2t horizon is clay that is 40 to 60 percent clay. It is 15 to 35 percent rock fragments.

Bedell Series

The Bedell series consists of very deep, somewhat excessively drained soils on alluvial fans and terraces. These soils formed in alluvium derived from mainly granitic rocks. Slopes are 2 to 15 percent.

Typical pedon of Bedell loamy sand, 4 to 8 percent slopes, 2,200 feet north and 100 feet east of the southwest corner of sec. 6, T. 22 N., R. 19 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 10 percent fine pebbles; neutral; clear smooth boundary.

A12—1 to 15 inches; grayish brown (10YR 5/2) heavy loamy sand, very dark grayish brown (10YR 3/2) moist; weak medium and coarse subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; 10 percent fine pebbles; neutral; clear smooth boundary.

B21t—15 to 24 inches; yellowish brown (10YR 5/4) heavy sandy loam, dark yellowish brown (10YR 3/4) moist; massive; very hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine and fine tubular pores; common thin clay films in pores and coating coarse fragments and sand grains; 10 percent fine pebbles; neutral; gradual smooth boundary.

B22t—24 to 54 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 3/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine and fine tubular pores; common thin clay films on coarse fragments and sand grains; 10 percent fine pebbles; neutral; gradual smooth boundary.

C1—54 to 65 inches; pale brown (10YR 6/3) loamy coarse sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; many very fine and fine interstitial pores; 10 percent fine pebbles; neutral.

The solum ranges from 30 to 55 inches in thickness. The B2t horizon is light sandy loam to heavy sandy loam that is 12 to 18 percent clay in the upper 20 inches. Reaction is slightly acid or neutral throughout the profile.

Biddleman Series

The Biddleman series consists of very deep, well drained soils on lakeshore terraces. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 15 percent.

Typical pedon of Biddleman gravelly sandy loam, in an area of Bluewing-Biddleman-Bundorf association, 2,600 feet east and 50 feet south of the northwest corner of sec. 6, T. 21 N., R. 24 E.

A11—0 to 2 inches; brown (10YR 5/3) gravelly sandy loam, brown (10YR 4/3) moist; moderate medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine vesicular pores; 20 percent pebbles, 3 percent cobbles; moderately alkaline; clear smooth boundary.

A12—2 to 3 inches; brown (10YR 5/3) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure parting to moderate fine subangular blocky; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine through medium vesicular pores; 15 percent pebbles, 5 percent cobbles; moderately alkaline; abrupt wavy boundary.

B21t—3 to 6 inches; brown (10YR 5/3) gravelly loam, brown (10YR 4/3) moist; weak medium prismatic structure parting to strong medium subangular blocky; hard, firm, sticky and slightly plastic; many very fine through medium roots; many very fine through medium pores; 20 percent pebbles; strongly alkaline; clear wavy boundary.

B22t—6 to 8 inches; brown (10YR 5/3) gravelly clay loam, brown (10YR 4/3) moist; weak medium prismatic structure parting to thin through thick platy; hard, firm, sticky and plastic; many very fine and common fine roots; many very fine and common fine tubular pores; 25 percent pebbles; moderately alkaline; clear smooth boundary.

C1ca—8 to 16 inches; brown (10YR 5/3) cobbly loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine roots; common fine and medium tubular pores, many fine interstitial pores; 15 percent pebbles, 15 percent cobbles; strongly effervescent; strongly alkaline; clear smooth boundary.

IIC2ca—16 to 30 inches; brown (10YR 4/3) extremely cobbly loamy sand, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores, few fine tubular pores; 30 percent pebbles, 45 percent cobbles; strongly effervescent; strongly alkaline; gradual wavy boundary.

IIC3ca—30 to 60 inches; light gray (10YR 7/2) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; massive; soft, friable, nonsticky and

nonplastic; few very fine and fine interstitial pores; 30 percent pebbles, 10 percent cobbles; strongly effervescent; strongly alkaline.

The thickness of the solum ranges from 8 to 18 inches. Reaction throughout the profile is moderately to strongly alkaline. The argillic horizon is loam, sandy clay loam, or clay loam that is 20 to 30 percent clay. It is 20 to 35 percent rock fragments.

Bieber Series

The Bieber series consists of shallow, well drained soils on terraces and pediments. These soils formed in alluvium and pedisediments derived from mixed rock sources. Slopes are 0 to 15 percent.

Typical pedon of Bieber stony sandy loam, 0 to 4 percent slopes, 570 feet east and 570 feet south of the northwest corner of sec. 20, T. 19 N., R. 19 E.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) stony sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine tubular pores; 5 percent pebbles, 5 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

A12—2 to 8 inches; dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) stony sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine prismatic structure; hard, firm, sticky and plastic; common fine roots; common fine tubular pores; 5 percent pebbles, 5 percent cobbles, 5 percent stones; few thin clay films on ped faces; neutral; abrupt smooth boundary.

B2t—8 to 19 inches; brown (10YR 5/3) clay, brown (10YR 4/3) moist; moderate coarse prismatic structure; very hard, very firm, very sticky and very plastic; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

IIC1sim—19 to 25 inches; very pale brown (10YR 7/3) indurated silica-cemented duripan; abrupt smooth boundary.

IIC2—25 to 60 inches; highly weathered tuff conglomerate with few thin plates of strongly cemented duripan.

The thickness of the solum and depth to the indurated duripan are 10 to 20 inches. The mollic epipedon is 7 to 20 inches thick and in some pedons includes part or all of the argillic horizon. Reaction throughout the profile is slightly acid to moderately alkaline. The Bt horizon is clay or heavy clay loam that is 35 to 45 percent clay.

Blackwell Series

The Blackwell series consists of very deep, poorly drained soils on flood plains and along stream bottoms. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 4 percent.

Typical pedon of Blackwell sandy loam, in an area of Macareeno-Blackwell-Carioca association, 400 feet west and 1,300 feet south of the northeast corner of sec. 19, T. 16 N., R. 19 E.

A11—0 to 4 inches; dark grayish brown (10YR 4/2) loamy sand, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; slightly acid; abrupt smooth boundary.

A12—4 to 11 inches; dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) moist; common medium prominent strong brown (7.5YR 5/6) mottles; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine to medium roots; many very fine to medium interstitial pores; slightly acid; abrupt smooth boundary.

A13—11 to 19 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; common medium prominent strong brown (7.5YR 5/6) mottles; fine moderate prismatic structure; slightly hard, friable, slightly sticky and nonplastic; many very fine to medium roots; many very fine to medium tubular pores; 3 percent fine pebbles; neutral; clear smooth boundary.

IIC1g—19 to 30 inches; light gray (10YR 6/1) gravelly sandy clay loam, dark gray (10YR 4/1) moist; many medium prominent strong brown mottles (7.5YR 5/6); massive; soft, very friable, nonsticky and nonplastic; common fine and medium roots; many fine interstitial pores; 15 percent fine pebbles; neutral; abrupt smooth boundary.

IIIC2—30 to 35 inches; very pale brown (10YR 7/3) coarse sandy loam, brown (10YR 5/3) moist; common medium prominent strong brown (7.5YR 5/6) mottles; massive; slightly hard, friable, slightly sticky and nonplastic; many fine and medium dead roots; many fine and medium tubular pores; neutral; abrupt smooth boundary.

IVC3—35 to 60 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; common medium yellowish red (5YR 5/8) mottles; strong fine subangular blocky structure; hard, firm, sticky and plastic; many fine and medium dead roots; many fine and medium tubular pores; neutral; clear smooth boundary.

The profile is more than 60 inches deep. These soils are wet during the winter under snow cover and remain water-logged until midsummer. Reaction ranges from slightly acid to neutral throughout the profile. The control section is sandy clay loam stratified with silt loam, loam, clay loam, coarse sandy loam, fine sandy loam, and

some thin strata of coarse sand. Clay content averages from 18 to 35 percent.

Bluewing Series

The Bluewing series consists of very deep, excessively drained soils on alluvial fans and terraces. These soils formed in sandy alluvium derived from mixed rock. Slopes are 4 to 15 percent.

Typical pedon of Bluewing very stony loamy sand, in an area of Hawsley-Ruhe-Bluewing association, 100 feet east and 100 feet south of the northwest corner of sec. 15, T. 24 N., R. 24 E.

A1—0 to 1 inch; light brownish gray (10YR 6/2) very stony loamy sand, dark grayish brown (10YR 4/2) moist; single grained; loose, nonsticky and nonplastic; very few roots; many very fine and fine interstitial pores; 25 percent pebbles, 15 percent stones; slightly effervescent; moderately alkaline; clear smooth boundary.

C1—1 to 9 inches; pale brown (10YR 6/3) very gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and few medium roots; common fine and medium tubular and many very fine and fine interstitial pores; 30 percent pebbles, 10 percent cobbles; moderately effervescent; strongly alkaline; clear wavy boundary.

IIC2ca—9 to 60 inches; pale brown (10YR 6/3) very gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and medium roots; many very fine and fine interstitial pores; 45 percent pebbles, 5 percent cobbles, 5 percent stones; strongly effervescent; strongly alkaline.

The profile is more than 60 inches deep. Reaction is mildly alkaline to strongly alkaline throughout. The control section from a depth of 10 inches to a depth of 40 inches is loamy coarse sand or coarse sand that is 3 to 10 percent clay. It is 50 to 80 percent rock fragments.

Bombadil Series

The Bombadil series consists of very shallow, well drained soils on mountain slopes. These soils formed in residuum derived mainly from basalt. Slopes are 15 to 50 percent.

Typical pedon of Bombadil very stony sandy loam, in an area of Bombadil-Hefed-Rubbleland association, 100 feet south and 2,600 feet west of the northeast corner of sec. 18, T. 20 N., R. 23 E.

A1—0 to 4 inches; pale brown (10YR 6/3) very stony sandy loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine to medium tubular and vesicular pores; 10 percent pebbles, 15 percent cobbles, 15 percent stones; neutral; abrupt smooth boundary.

B21t—4 to 8 inches; brown (10YR 5/3) gravelly loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; many thin clay films on ped faces and lining pores and rock fragments; 15 percent pebbles, 5 percent cobbles; neutral; gradual smooth boundary.

B22t—8 to 13 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; massive; hard, very friable, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; many thin clay films on ped faces and rock fragments and lining pores; 20 percent pebbles; neutral; abrupt smooth boundary

R—13 inches; fractured and weathered basaltic bedrock.

Depth to bedrock ranges from 7 to 14 inches. Reaction throughout the profile is neutral to mildly alkaline. The control section is loam and is 18 to 25 percent clay. The B horizon is 10 to 20 percent rock fragments.

Booford Series

The Booford series consists of moderately deep, well drained soils on mountain slopes. These soils formed in residuum derived mainly from andesitic tuff. Slopes are 8 to 50 percent.

Typical pedon of Booford very stony loam, 30 to 50 percent slopes, 1,100 feet west and 1,800 feet south of the northeast corner of sec. 28., T. 19 N., R. 18 E.

A11—0 to 3 inches; grayish brown (10YR 5/2) very stony loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores and many very fine and fine interstitial pores; 5 percent pebbles, 10 percent cobbles, 10 percent stones; slightly acid; clear smooth boundary.

A12—3 to 8 inches; dark grayish brown (10YR 4/2) gravelly clay loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many medium, common very fine and fine, and few coarse roots; many very fine and fine tubular pores; 15 percent pebbles; slightly acid; clear smooth boundary.

B1t—8 to 12 inches; dark brown (7.5YR 4/2) clay, dark brown (10YR 3/3) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common very fine to medium roots; common very

fine and fine tubular pores; common thin clay films on ped faces and in pores; 10 percent pebbles; slightly acid; clear smooth boundary.

B2t—12 to 20 inches; brown (10YR 4/3) clay, dark yellowish brown (10YR 3/4) moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; few very fine through coarse roots; common very fine and fine tubular pores; continuous moderately thick clay films coating ped faces and pores; slightly acid; smooth boundary.

B3t—20 to 25 inches; brown (10YR 4/3) clay, dark yellowish brown (10YR 3/4) moist; massive; very hard, very firm, very sticky and very plastic; few fine and medium roots; very few pores; continuous moderately thick clay films coating coarse fragments; 10 percent pebbles; slightly acid; clear wavy boundary.

C1r—25 to 45 inches; weathered andesitic tuff with some thick clay films and roots in fractures.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The mollic epipedon is 7 to 15 inches thick and includes the upper part of the argillic horizon. Reaction throughout the profile is slightly acid to neutral. The Bt horizon is clay or gravelly clay and has a thin layer of clay loam in the upper part. It averages 45 to 60 percent clay and is 5 to 20 percent gravel.

Boomtown Series

The Boomtown series consists of very deep, well drained soils that formed in mixed colluvium derived mainly from andesite and basalt and in residuum of andesite. These soils are on plateaus and mountain slopes. Slopes are 30 to 50 percent.

Typical pedon of Boomtown very stony sandy loam, in an area of Jorge-Boomtown-Fugawee association, 850 feet east and 1,180 feet north of the southwest corner of sec. 3, T. 18 N., R. 18 E.

O1—4 to 3 inches; partially decomposed pine and fir needles; abrupt smooth boundary.

O2—3 inches to 0; strongly decomposed fir and pine needle duff; abrupt smooth boundary.

A11—0 to 11 inches; dark grayish brown (10YR 4/2) very stony sandy loam, very dark brown (10YR 2/2) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots and many medium and coarse roots; many very fine and fine tubular pores; 10 percent pebbles, 10 percent cobbles, 15 percent stones; slightly acid; clear wavy boundary.

A12—11 to 17 inches; brown (10YR 4/3) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine through coarse roots; many very fine and fine tubular pores; 15 percent pebbles, 5 percent cobbles; slightly acid; abrupt wavy boundary.

A2—17 to 22 inches; light yellowish brown (10YR 6/4) gravelly loam, yellowish brown (10YR 5/4) moist; weak and moderate fine and medium subangular blocky structure; hard, friable, sticky and slightly plastic; few very fine and fine roots and common medium and coarse roots; many very fine and fine tubular pores and common medium tubular pores; common thin clay films on peds and in pores; 20 percent pebbles; slightly acid; clear wavy boundary.

IIB2t—22 to 41 inches; very pale brown (10YR 7/4) clay, brownish yellow (10YR 6/8) moist; moderate coarse prismatic structure; hard, firm, sticky and plastic; few fine and medium inped roots; few fine and medium tubular pores; continuous thin and moderately thick clay films on peds and in pores; 5 percent saprolitic gravel; medium acid; clear wavy boundary.

IIB3t—41 to 53 inches; yellow (10YR 7/6) clay, brownish yellow (10YR 6/8) moist; many medium and large prominent very pale brown (10YR 8/3) mottles; moderate fine angular blocky structure; hard, firm, sticky and plastic; very few fine roots; common fine and medium tubular pores; many thin clay films on ped faces and in pores; 5 percent saprolitic gravel; slightly acid; clear wavy boundary.

IIC—53 to 61 inches; yellow (10YR 7/6) clay loam, brownish yellow (10YR 6/8) moist; many medium and large prominent very pale brown (10YR 8/3) mottles; massive; hard, firm, sticky and plastic; very few fine roots; very few fine tubular pores; many thin clay films on peds and in pores.

The solum thickness ranges from 40 to 60 inches. Reaction throughout the profile is medium acid to slightly acid. The control section is clay loam or clay that is 35 to 50 percent clay. It is 5 to 35 percent rock fragments.

Bundorf Series

The Bundorf series consists of shallow, well drained soils that formed in alluvium derived from mixed rock. These soils are on alluvial fans. Slopes are 4 to 15 percent.

Typical pedon of Bundorf very stony loam, in an area of Sutcliff-Bundorf-Kleinbush association, 1,200 feet north and 100 feet east of the southwest corner of sec. 14, T. 22 N., R. 24 E.

A1—0 to 2 inches; light gray (10YR 7/2) very stony loam, brown (10YR 5/3) moist; moderate thick platy and weak thin platy structure; soft, very friable, sticky and plastic; few very fine roots; many very fine and fine vesicular pores; moderately alkaline; strongly effervescent; clear smooth boundary.

B1t—2 to 6 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; moderate fine and medium angular blocky structure; slightly hard, friable, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; common thin clay films lining pores; moderately alkaline; effervescent; clear smooth boundary.

B2t—6 to 10 inches; pale brown (10YR 6/3) clay, dark yellowish brown (10YR 4/4) moist; strong medium prismatic structure; very hard, firm, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; common moderately thick clay films on faces of peds and lining pores; strongly effervescent; strongly alkaline; abrupt smooth boundary.

B3tca—10 to 14 inches; light brown (7.5YR 6/4) very cobbly clay loam, brown (7.5YR 5/4) moist; massive; hard, friable, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; few thin clay films lining pores; 20 percent pebbles, 20 percent cobbles; violently effervescent; strongly alkaline; abrupt wavy boundary.

C1sica—14 to 19 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, and brittle, slightly sticky and slightly plastic; common very fine roots; many very fine and fine interstitial pores; 20 percent pebbles, 25 percent cobbles, 10 percent stones; violently effervescent; continuous weak silica cementation; very strongly alkaline; abrupt wavy boundary.

C2sicam—19 to 27 inches; indurated duripan.

The thickness of the solum ranges from 10 to 20 inches. The depth to the duripan ranges from 14 to 20 inches. Reaction in the solum ranges from mildly alkaline to strongly alkaline. The Bt horizon is clay or heavy clay loam that is 35 to 50 percent clay.

Burnborough Series

The Burnborough series consists of very deep, well drained soils on hillsides. These soils formed in residuum and colluvium derived from mixed rocks, predominantly andesite and rhyolite. Slopes are 15 to 50 percent.

Typical pedon of Burnborough very gravelly loam, in an area of Burnborough-Ticino-Gabica association, 600 feet east and 2,400 feet south of the northwest corner of sec. 23, T. 20 N., R. 18 E.

A11—0 to 5 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 50 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

A12—5 to 11 inches; brown (10YR 4/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; 40 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

B1t—11 to 17 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; moderately thin clay films lining pores; 30 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

B2t—17 to 29 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky and plastic; few very fine through medium roots; many very fine and fine tubular pores; common thin and moderately thick clay films lining pores and coating rock fragments; 40 percent pebbles, 15 percent cobbles; neutral; clear smooth boundary.

B3t—29 to 60 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; few thin clay films lining pores and coating rock fragments; 45 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid.

The solum thickness ranges from 40 to more than 60 inches. Reaction throughout the profile is slightly acid to neutral.

The Bt horizon is loam or light clay loam that is 18 to 35 percent clay. It is 35 to 60 percent rock fragments.

Cagle Series

The Cagle series consists of moderately deep, well drained soils on mountain slopes. These soils formed in colluvium and residuum derived from andesite. Slopes are 15 to 30 percent.

Typical pedon of Cagle very stony clay loam, in an area of Indiano-Duco-Cagle association, 150 feet east and 800 feet south of the northwest corner of sec. 35, T. 17 N., R. 20 E.

A11—0 to 7 inches; grayish brown (10YR 5/2) very stony clay loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular and interstitial pores; 25 percent pebbles, 15 percent stones; neutral; clear smooth boundary.

B21t—7 to 11 inches; grayish brown (10YR 5/2) gravelly clay loam, very dark grayish brown (10YR 3/2)

moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; common fine and medium roots; common fine tubular pores; common thin clay films in pores on ped faces and coating rock fragments; 25 percent pebbles; neutral; clear smooth boundary.

B22t—11 to 20 inches; pale brown (10YR 6/3) gravelly clay, dark grayish brown (10YR 4/2) moist; strong medium and coarse subangular blocky structure; very hard, friable, sticky and plastic; common fine through coarse roots; common fine tubular pores; many moderately thick clay films in pores, on peds, and coating rock fragments; 20 percent pebbles; neutral; clear smooth boundary.

B23t—20 to 23 inches; pale brown (10YR 6/3) very gravelly clay, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few fine and medium roots; few fine tubular pores; 30 percent pebbles, 15 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

Cr—23 inches; highly weathered andesitic bedrock with few medium roots in the clay in cracks.

The depth of the solum to the paralithic contact ranges from 20 to 40 inches. The mollic epipedon is 7 to 18 inches thick and includes the upper part of the B2t horizon. Reaction throughout the profile is slightly acid to neutral. The argillic horizon is clay or clay loam that is 35 to 50 percent clay. It is 20 to 30 percent rock fragments in the upper part and 50 to 80 percent rock fragments in the lower part.

Calpine Series

The Calpine series consists of very deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium derived mainly from granitic rocks. Slopes are 4 to 8 percent.

Typical pedon of Calpine coarse sandy loam, 4 to 8 percent slopes, 1,200 feet west and 200 feet north of the southeast corner of sec. 19, T. 22 N., R. 18 E.

A11—0 to 2 inches; brown (10YR 5/3) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; very few roots; many fine interstitial pores; 5 percent gravel; medium acid; clear smooth boundary.

A12—2 to 19 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and few medium roots; many very fine interstitial and common fine tubular pores; 10 percent gravel; medium acid; clear smooth boundary.

B21—19 to 30 inches; brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) moist; weak medium prismatic structure; hard, friable, slightly sticky and slightly plastic; many very fine and medium roots; many very fine and fine tubular and common fine interstitial pores; 10 percent gravel; few thin clay films bridging sand grains; medium acid; clear smooth boundary.

B22—30 to 45 inches; light yellowish brown (10YR 6/4) sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine to coarse roots; common very fine to medium tubular pores; few thin clay films bridging sand grains; slightly acid; clear smooth boundary.

C1—45 to 65 inches; light yellowish brown (10YR 6/4) loamy fine sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; very few roots; many very fine interstitial pores; slightly acid.

The profile is more than 60 inches deep. The mollic epipedon is 10 to 20 inches thick. Reaction ranges from medium acid to neutral; the more acid horizons are in the upper part of the profile. The control section is sandy loam or coarse sandy loam that is 5 to 15 percent clay.

Carioca Series

The Carioca series consists of very deep, moderately well drained soils on uplands. These soils formed in residuum and colluvium derived from andesite. Slopes are 4 to 30 percent.

Typical pedon of Carioca stony sandy loam, in an area of Carioca-Sibelia Variant-Fugawee association, 300 feet east and 2,500 feet south of the northwest corner of sec. 22, T. 18 N., R. 18 E.

O1—1 inch to 0; lodgepole pine needle duff.

A1—0 to 7 inches; brown (10YR 5/3) stony sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, friable, nonsticky and nonplastic; many very fine, fine, and medium roots; many fine vesicular and few fine tubular pores; 45 percent pebbles, 2 percent stones; medium acid; clear smooth boundary.

A2—7 to 18 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium, and coarse roots; many fine vesicular and few fine tubular pores; 50 percent pebbles, 5 percent cobbles, 5 percent stones; medium acid; abrupt wavy boundary.

A3—18 to 30 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist, dark brown (10YR 3/3) moist ped faces; moderate fine

angular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine and medium roots; common very fine tubular pores; common thin clay films in pores; 45 percent pebbles, 5 percent cobbles, 5 percent stones; medium acid; clear wavy boundary.

B2t—30 to 40 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; moderate fine angular blocky structure; very hard, firm, slightly sticky and slightly plastic; few very fine through medium roots; common fine tubular pores; many thin clay films on ped faces; 40 percent pebbles, 5 percent cobbles, 5 percent stones; medium acid; clear wavy boundary.

B3t—40 to 56 inches; pale brown (10YR 6/3) extremely gravelly loam, dark brown (10YR 3/3) moist; few faint dark yellowish brown mottles; massive; very hard, firm, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common very fine tubular pores; common thin clay films bridging sand grains and coating coarse fragments; 50 percent pebbles, 25 percent cobbles, 5 percent stones; slightly acid; clear wavy boundary.

C1—56 to 65 inches; pale brown (10YR 6/3) gravelly loam, dark grayish brown (10YR 4/2) moist; common faint dark yellowish brown (10YR 4/4) mottles; massive; very hard, firm, sticky and plastic; very few very fine and fine roots; few fine tubular pores; many pressure faces; 30 percent gravel; slightly acid; gradual irregular boundary.

Cr—65 to 75 inches; highly weathered andesite that wets to clay loam with hard andesite stones and boulders.

The solum thickness ranges from 40 to 60 inches. Depth to a paralithic contact is more than 60 inches. Reaction is medium acid to slightly acid throughout the profile.

The B2t horizon is loam or clay loam that is 15 to 30 percent clay. It is 35 to 75 percent rock fragments.

Cassiro Series

The Cassiro series consists of deep and very deep, well drained soils on smooth to slightly convex alluvial fans and terraces. These soils formed in alluvium derived from mixed rock. Slopes are 2 to 15 percent.

Typical pedon of Cassiro gravelly sandy loam, 2 to 4 percent slopes, 1,320 feet east and 150 feet south of the northwest corner of sec. 8., T. 20 N., R. 19 E.

A11—0 to 1 inch; dark brown (10YR 4/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; 40 percent pebbles; slightly acid; clear wavy boundary.

A12—1 to 5 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (7.5YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 30 percent pebbles; medium acid; clear wavy boundary.

A13—5 to 10 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (7.5YR 3/2) moist; massive; hard, friable, nonsticky and nonplastic; common very fine, fine, medium, and coarse roots; many very fine interstitial pores; 30 percent pebbles; medium acid; clear wavy boundary.

B1—10 to 15 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure; hard, friable, nonsticky and slightly plastic; common very fine, fine, medium, and coarse roots; few very fine tubular pores; few thin clay films bridging and coating sand grains and in pores; 15 percent gravel; medium acid; abrupt wavy boundary.

B21t—15 to 26 inches; brown (7.5YR 5/4) gravelly sandy clay, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; very hard, firm, sticky and plastic; common very fine, fine, medium, and coarse roots; few very fine and fine tubular pores; common thin and few moderately thick clay films on ped faces and in pores; 40 percent pebbles; medium acid; clear wavy boundary.

B22t—26 to 45 inches; brown (7.5YR 5/4) very gravelly sandy clay, dark reddish brown (5YR 3/4) moist; massive; very hard, firm, sticky, plastic; few very fine roots; few very fine and fine tubular pores; many thin clay films coating and bridging sand grains and in pores; 40 percent pebbles, 10 percent cobbles; medium acid; abrupt wavy boundary.

IIC1—45 to 65 inches; stratified compact tuff, silts, and ash.

The solum ranges from 40 to 60 inches in thickness. Reaction in the solum ranges from medium acid to slightly acid.

The Bt horizon is very gravelly sandy clay loam, very gravelly clay loam, and very gravelly sandy clay. The clay content is 35 to 45 percent. The content of rock fragments in the argillic horizon ranges from 35 to 55 percent.

Celeton Variant

The Celeton Variant consists of shallow and very shallow, somewhat excessively drained soils on terraces. These soils formed in residuum derived mainly from lacustrine sedimentary rock. Slopes are 2 to 8 percent.

Typical pedon of Celeton Variant very gravelly loam in an area of Chalco-Celeton Variant complex, 2 to 8 percent slopes, 900 feet west and 2,000 feet north of the southeast corner of sec. 5, T. 21 N., R. 20 E.

A1—0 to 2 inches; light gray (10YR 7/2) gravelly loam, grayish brown (2.5Y 5/2) moist; moderate thick platy structure; soft, very friable, slightly sticky and slightly plastic; very few roots; common fine vesicular pores; 15 percent pebbles; effervescent; moderately alkaline; clear smooth boundary.

C1—2 to 6 inches; light gray (10YR 7/2) very gravelly loam, grayish brown (2.5Y 5/2) moist; moderate thin platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine to coarse roots; 40 percent pebbles, 5 percent cobbles; slightly effervescent; moderately alkaline; gradual irregular boundary.

C2r—6 to 60 inches; highly fractured lacustrine sedimentary rock with some soil and roots in cracks to a depth of 16 inches; effervescent in spots.

The depth to weathered lacustrine sedimentary rock is 5 to 15 inches. Reaction in the profile is moderately alkaline. Texture of the control section is loam that is 15 to 24 percent clay. Rock fragments on the soil surface are hard, but rock fragments within the profile are soft. They make up from 35 to 90 percent of the profile.

Chalco Series

The Chalco series consists of shallow, well drained soils on pediment remnants. These soils formed in pedisediments derived from mixed rock. Slopes are 4 to 50 percent.

Typical pedon of Chalco stony loam, 4 to 8 percent slopes, 2,000 feet west and 1,300 feet north of the southeast corner of sec. 5, T. 19 N., R. 19 E.

The weak erosion pavement consists of gravel on 35 percent of the surface, cobbles on 5 percent, and stones on 1 percent.

A1—0 to 3 inches; light brownish gray (10YR 6/2) stony loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine vesicular pores; neutral; abrupt smooth boundary.

B2t—3 to 12 inches; dark yellowish brown (10YR 4/4) clay, dark yellowish brown (10YR 4/4) moist; strong medium prismatic structure; extremely hard, very firm, very sticky and very plastic; few very fine to medium roots; few very fine to medium tubular pores; continuous thick clay films on ped faces; neutral; gradual smooth boundary.

IIB3t—12 to 15 inches; yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 4/4) moist; massive; hard, very firm, sticky and plastic; very few roots; very few pores; common moderately thick clay films in pores; 15 percent weathered sedimentary rock fragments; neutral; abrupt wavy boundary.

IICr—15 to 30 inches; weathered sedimentary rock.

The thickness of the solum and the depth to weathered sedimentary rock are 10 to 20 inches. Reaction is commonly slightly acid or neutral but ranges to mildly alkaline in the A horizon in some pedons. Reaction in the B2t horizon is commonly slightly acid or neutral but ranges to moderately alkaline just above bedrock. The Bt horizon is clay that is 40 to 60 percent clay.

Corbett Series

The Corbett series consists of moderately deep, somewhat excessively drained soils on uplands. These soils formed in weathered material derived mainly from granitic rocks. Slopes are 15 to 50 percent.

Typical pedon of Corbett bouldery sand, in an area of Toiyabe-Corbett-Rock outcrop association, steep, 600 feet east and 1,320 feet north of the southwest corner of sec. 16, T. 16 N., R. 19 E.

O—1 inch to 0; pine needle duff.

A11—0 to 3 inches; dark grayish brown (10YR 4/2) bouldery sand, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; many very fine and fine interstitial pores; 20 percent pebbles, 10 percent boulders; medium acid; clear smooth boundary.

A12—3 to 8 inches; grayish brown (10YR 5/2) bouldery coarse sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine to coarse roots; many very fine and fine interstitial pores; 20 percent pebbles, 10 percent boulders; slightly acid; clear wavy boundary.

C1—8 to 17 inches; pale brown (10YR 6/3) gravelly loamy coarse sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine to coarse roots; many very fine and fine interstitial pores; 25 percent fine pebbles; slightly acid; gradual wavy boundary.

C2—17 to 32 inches; pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine to coarse roots; many very fine and fine interstitial pores; 25 percent fine pebbles; slightly acid; abrupt irregular boundary.

C3r—32 to 40 inches; weathered granodiorite.

The depth to weathered bedrock is 24 to 40 inches. Reaction throughout the profile is medium acid to slightly acid. The control section is loamy coarse sand or loamy sand that is 0 to 5 percent clay. It is 10 to 35 percent rock fragments.

Cradlebaugh Series

The Cradlebaugh series consists of very deep, poorly drained soils on slightly concave alluvial fans. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 2 percent.

Typical pedon of Cradlebaugh loam, 2,500 feet east and 1,000 feet north of the southwest corner of sec. 36, T. 21 N., R. 18 E.

A1—0 to 10 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine to medium subangular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; many very fine and fine tubular pores; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—10 to 24 inches; light brownish gray (2.5Y 6/2) sandy clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; many very fine and fine roots; many very fine and fine tubular pores; strongly effervescent; strongly alkaline; clear wavy boundary.

C2si—24 to 29 inches; light gray (N 7/0) weakly silica-cemented loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, and brittle; few very fine roots; few very fine tubular pores; few fine segregated lime concretions; strongly effervescent; strongly alkaline; abrupt wavy boundary.

C3gsi—29 to 35 inches; white (N 8/0) fine sandy loam, grayish brown (2.5Y 5/2) moist; common medium distinct dark reddish brown (5YR 3/3) mottles; hard, firm and brittle; few very fine roots; few very fine tubular pores; discontinuous weak silica cementation; strongly alkaline; clear smooth boundary.

C4—35 to 60 inches; pale brown (10YR 6/3) sandy loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; moderately alkaline.

The depth to the discontinuous weak silica cementation or to the horizon that contains durinodes ranges from 18 to 30 inches. These soils are calcareous to a depth of 20 to 30 inches. The mollic epipedon is 10 to 14 inches thick. Reaction throughout the profile ranges from moderately alkaline to strongly alkaline. The control section (between a depth of 10 inches and a depth of 40 inches) averages 20 to 30 percent clay.

Dalzell Series

The Dalzell series consists of moderately deep, somewhat poorly drained soils on terraces. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 2 percent.

Typical pedon of Dalzell loamy fine sand, 850 feet east and 850 feet north of the southwest corner of sec. 8, T. 16 N., R. 20 E.

A11—0 to 9 inches; light brownish gray (2.5Y 6/2) loamy fine sand, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine to coarse roots; many very fine to medium pores; strongly alkaline; abrupt smooth boundary.

A12—9 to 14 inches; light brownish gray (2.5Y 6/2) heavy loamy fine sand, dark grayish brown (2.5Y 4/2) moist; moderate fine platy structure; hard, friable, slightly sticky and nonplastic; common fine and very fine roots; slightly effervescent; very strongly alkaline; clear smooth boundary.

B1t—14 to 18 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak thin platy structure; very hard, firm, slightly sticky and slightly plastic; few fine and very fine roots; few thin clay films on ped faces and in pores; effervescent; very strongly alkaline; clear smooth boundary.

B2t—18 to 24 inches; pale brown (10YR 6/3) sandy clay loam, dark brown (10YR 4/3) moist; weak medium and coarse prismatic structure; very hard, firm, sticky and plastic; few fine and very fine roots; common thin clay films on ped faces; common moderately thick clay films in pores; effervescent; very strongly alkaline; clear smooth boundary.

B3t—24 to 32 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; massive; very hard, firm, sticky and plastic; very few roots; few thin clay films in pores; 15 percent strongly cemented durinodes and some weak silica-cemented lamellae in the lower portions; strongly effervescent; very strongly alkaline; clear smooth boundary.

C1casim—32 to 36 inches; light gray (10YR 7/2) strongly cemented duripan, yellowish brown (10YR 5/4) moist; few medium prominent strong brown (7.5YR 5/6) mottles, brittle moist; strongly effervescent; strongly alkaline; clear smooth boundary.

C2casi—36 to 39 inches; very pale brown (10YR 7/3) loamy sand, light olive brown (2.5Y 5/4) moist; common medium prominent strong brown (7.5YR 5/6) mottles; massive; nonsticky and nonplastic; thin silica-cemented lamellae that are brittle when moist; strongly effervescent; strongly alkaline; abrupt wavy boundary.

C3—39 to 61 inches; very pale brown (10YR 7/2) stratified sand, coarse sand, gravelly sand, and loamy fine sand, yellowish brown (10YR 5/4) moist; many large prominent mottles that are yellowish red (5YR 4/6) moist; massive; nonsticky and nonplastic; strongly alkaline.

The thickness of the solum and the depth to the strongly cemented duripan range from 20 to 40 inches. Reaction throughout the profile is strongly alkaline to very strongly alkaline. The Bt horizon is fine sandy loam, sandy loam, loam, and sandy clay loam and averages 18 to 35 percent clay.

Dithod Series

The Dithod series consists of very deep, somewhat poorly drained soils on flood plains and low terraces. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 2 percent.

Typical pedon of Dithod sandy loam, 1,500 feet east and 650 feet north of the southwest corner of sec. 8, T. 19 N., R. 20 E.

A11—0 to 7 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; neutral; clear smooth boundary.

A12—7 to 15 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; 10 percent pebbles; neutral; clear smooth boundary.

C1—15 to 60 inches; light brownish gray (10YR 6/2) stratified loamy fine sand, sandy loam, sandy clay loam, and clay loam, dark grayish brown (10YR 4/2) moist; common medium prominent brown (7.5YR 4/4) mottles; massive; hard, friable, slightly sticky and slightly plastic; few fine and very fine and common medium roots; common fine and very fine pores; 10 percent pebbles; neutral.

The profile is more than 60 inches thick. The mollic epipedon is 10 to 18 inches thick. Reaction throughout the profile ranges from neutral to moderately alkaline. The control section is stratified, and its texture ranges from loamy fine sand to clay loam. Clay content averages 18 to 25 percent.

Doten Series

The Doten series consists of very deep, moderately well drained soils on lake terraces, clay dunes, and basin plains. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 15 percent.

Typical pedon of Doten silty clay, 0 to 2 percent slopes, 1,300 feet east and 800 feet north of the southwest corner of sec. 25, T. 21 N., R. 18 E.

Ap1—0 to 1 inch; dark grayish brown (2.5Y 4/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong very fine granular structure; soft, friable, sticky and very plastic; many very fine interstitial pores; mildly alkaline; abrupt wavy boundary.

Ap2—1 to 7 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium to coarse subangular blocky structure; hard, friable, very sticky and very plastic; many very fine and fine and few coarse roots; few fine tubular pores; mildly alkaline; abrupt wavy boundary.

A1—7 to 21 inches; grayish brown (2.5Y 5/2) clay, dark grayish brown (10YR 4/2) moist; strong coarse columnar structure; very hard, firm, very sticky and very plastic; common very fine to medium and few coarse roots; few very fine tubular pores; common pressure faces on peds and few intersecting slickensides; slightly effervescent; strongly alkaline; clear wavy boundary.

C1—21 to 28 inches; grayish brown (10YR 5/2) clay, brown (10YR 4/3) moist; massive; very hard, firm, very sticky and very plastic; few very fine and fine roots; few very fine tubular pores; common pressure faces and few intersecting slickensides; strongly effervescent; strongly alkaline; clear wavy boundary.

C2ca—28 to 50 inches; pale brown (10YR 6/3) silty clay, brown (10YR 4/3) moist; few fine distinct brown (7.5YR 4/2), many medium distinct very pale brown (10YR 8/3), and common fine prominent strong brown (7.5YR 5/6) mottles; massive; hard, friable, sticky and very plastic; few micro and very fine roots; few very fine tubular pores; violently effervescent; strongly alkaline; gradual wavy boundary.

C3ca—50 to 62 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; many medium distinct very pale brown (10YR 8/3), common fine prominent strong brown (7.5YR 5/6), and few fine faint brown (7.5YR 4/2) mottles; massive; hard, friable, sticky and plastic; few very fine roots; few very fine tubular pores; violently effervescent; moderately alkaline.

The solum ranges from 12 to 24 inches in thickness. Reaction in the profile ranges from mildly alkaline to very strongly alkaline. The control section is clay or silty clay that is 40 to 60 percent clay.

These soils have cracks that are open at the surface in summer and fall and are closed in winter and spring. Depth to mottles ranges from 22 to 36 inches. These soils have slight to strong salt concentrations in most horizons.

Doten Variant

The Doten Variant consists of very deep, moderately well drained soils on slightly concave lacustrine terraces

and basin-fill plains. These soils formed in fine lacustrine deposits derived from mixed rock. Slopes are 0 to 2 percent.

Typical pedon of Doten Variant silty clay, strongly saline, 2,000 feet west and 1,600 feet north of the southeast corner of sec. 22, T. 21 N., R. 19 E.

A11—0 to 2 inches; light gray (10YR 7/2) silty clay, brown (10YR 5/3) moist; strong medium platy structure; soft, friable, sticky and very plastic; common fine to medium interstitial pores and common fine tubular pores; violently effervescent; strongly alkaline; abrupt wavy boundary.

A12—2 to 5 inches; light gray (10YR 7/2) silty clay, brown (10YR 5/3) moist; weak medium platy structure; hard, friable, very sticky and very plastic; common very fine roots; common fine to medium interstitial pores, and common fine tubular pores; violently effervescent; strongly alkaline; clear wavy boundary.

C1—5 to 21 inches; light gray (10YR 7/2) silty clay, brown (10YR 5/3) moist; weak medium platy structure; hard, friable, very sticky and very plastic; few very fine to coarse roots; few fine tubular pores; few slickensides; violently effervescent; strongly alkaline; clear wavy boundary.

C2—21 to 31 inches; light gray (10YR 7/2) silty clay, brown (10YR 5/3) moist; moderate very fine subangular blocky structure; hard, friable, very sticky and very plastic; few very fine to coarse roots; few fine tubular pores; few slickensides; violently effervescent; strongly alkaline; clear wavy boundary.

C3—31 to 41 inches; light gray (10YR 7/2) silty clay, brown (10YR 5/3) moist; massive; hard, friable, very sticky and very plastic; few very fine to medium roots; few very fine tubular pores; violently effervescent; strongly alkaline; clear wavy boundary.

C4—41 to 51 inches; light gray (10YR 7/2) clay, brown (10YR 4/3) moist; common medium distinct dark brown (7.5YR 3/2) mottles; common fine distinct white (10YR 8/1) gypsum flecks; weak fine subangular blocky structure; hard, friable, very sticky and very plastic; few very fine to medium roots; few very fine tubular pores; violently effervescent; strongly alkaline; clear wavy boundary.

C5—51 to 72 inches; light gray (2.5Y 7/2) clay, grayish brown (2.5Y 5/2) moist; common medium distinct dark brown (7.5YR 3/2) mottles; strong fine subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; violently effervescent; strongly alkaline.

The soil profile is more than 60 inches deep. The control section (between depths of 10 inches and 40 inches) is silty clay or clay. The average content of clay is 40 to 60 percent. Surface cracks are 1 to 2 inches wide and 2 to 3 feet deep. They are open in summer and fall and closed in winter and spring. Mottles are below a depth of 40 to 50 inches.

Dressler Series

The Dressler series consists of very deep, somewhat poorly drained soils on alluvial fans and flood plains. These soils formed in alluvium derived from mixed rock. Slopes are 2 to 4 percent.

Typical pedon of Dressler loamy sand, 2 to 4 percent slopes, 800 feet west and 2,200 feet south of the northeast corner of sec. 7., T. 17 N., R. 20 E.

Ap—0 to 8 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; 10 to 15 percent pebbles; slightly acid; clear smooth boundary.

A1—8 to 19 inches; grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, slightly sticky and nonplastic; 20 percent pebbles; slightly acid; clear smooth boundary.

C1—19 to 25 inches; light yellowish brown (10YR 6/4) gravelly loamy sand and gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; 20 percent pebbles, 5 percent cobbles; slightly acid; clear smooth boundary.

C2—25 to 60 inches; pale brown (10YR 6/3) stratified gravelly loamy sand and gravelly fine sandy loam, dark yellowish brown (10YR 4/4) moist; large prominent strong brown (7.5YR 5/6) mottles; massive; soft, very friable, nonsticky and nonplastic; 20 percent pebbles, 5 percent cobbles; slightly acid.

The soil profile is more than 60 inches thick. The mollic epipedon is 12 to 20 inches thick. Reaction throughout the profile is slightly acid to neutral. The average texture in the control section is gravelly sandy loam or sandy loam that is 2 to 10 percent clay. The control section is 5 to 35 percent rock fragments. Prominent or distinct mottles are between depths of 22 and 30 inches and extend to 60 inches.

Duckhill Series

The Duckhill series consists of very shallow, well drained soils on uplands. These soils formed in residuum derived mainly from altered andesite or rhyolite. Slopes are 30 to 50 percent.

Typical pedon of Duckhill stony loam, 30 to 50 percent slopes, 1,800 feet east and 750 feet south of the northwest corner of sec. 4, T. 18 N., R. 19 E.

O—0.5 inch to 0; pine needle duff.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) stony loam, dark brown (7.5YR 3/2) moist; moderate

medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; very few roots; many fine and very fine interstitial pores; 35 percent pebbles, 1 percent stones, 5 percent cobbles; medium acid; clear smooth boundary.

B1t—3 to 6 inches; yellowish brown (10YR 5/4) very gravelly heavy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and medium roots; common fine tubular pores; many very fine interstitial pores; common thin clay films coating sand grains; 30 percent pebbles, 10 percent cobbles; medium acid; clear wavy boundary.

B2t—6 to 9 inches; yellowish brown (10YR 5/4) very gravelly light clay loam, dark brown (7.5YR 4/4) moist; massive; soft, friable, sticky and slightly plastic; common fine and few medium roots; common fine tubular pores; common moderately thick clay films in pores and coating coarse fragments; 50 percent pebbles; medium acid; abrupt irregular boundary.

C1r—9 to 12 inches; highly weathered altered andesite with a few medium roots and moderate thick clay films in the fractures; some soil in the larger cracks.

R—12 to 14 inches; hard altered andesite bedrock that is fractured.

The depth to weathered bedrock ranges from 6 to 10 inches, and the depth to hard bedrock ranges from 10 to 14 inches. Reaction in the solum is medium acid or slightly acid. The control section from surface to bedrock averages very gravelly loam that is 10 to 30 percent clay. The content of rock fragments through the whole profile averages 35 to 60 percent.

Duckhill Variant

The Duckhill Variant consists of very shallow, well drained soils on ridges. These soils formed in residuum from volcanic rocks. Slopes are 30 to 70 percent.

Typical pedon of Duckhill Variant very stony sandy loam, in an area of Fraval-Hirschdale-Duckhill Variant association, 2,000 feet west and 1,700 feet north of the southeast corner of sec. 5, T. 18 N., R. 18 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 10 percent pebbles; 10 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

A12—4 to 8 inches; brown (10YR 5/3) very stony sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine through medium roots; common very fine and fine interstitial and tubular pores; 25 percent pebbles, 25 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

B2t—8 to 13 inches; yellowish brown (10YR 5/4) very cobbly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; few medium roots; common very fine and fine tubular pores; moderately thick clay films on ped faces, pores, and rock fragments; 10 percent pebbles, 40 percent cobbles, 10 percent stones; neutral; abrupt irregular boundary.

R—13 inches; hard andesite, some roots and clay films in fractures.

The solum thickness and the depth to hard bedrock are less than 14 inches. Reaction in the solum is slightly acid or neutral. The B2t horizon is clay loam, loam, or sandy clay loam that is 18 to 30 percent clay. It is 50 to 65 percent rock fragments.

Duco Series

The Duco series consists of shallow, well drained soils on mountain ridges and slopes. These soils formed in residuum mainly of rhyolite. Slopes are 15 to 50 percent.

Typical pedon of Duco very stony sandy loam, in an area of Indiano-Zephan-Duco association, 2,400 feet west and 2,400 feet south of northeast corner, sec. 27, T. 24 N., R. 18 E.

A11—0 to 3 inches; brown (10YR 5/3) very stony sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; 20 percent pebbles, 15 percent cobbles, 15 percent stones; neutral; clear smooth boundary.

A12—3 to 7 inches; brown (10YR 5/3) very gravelly fine sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, medium, and coarse roots; many very fine, fine, and medium tubular pores; 35 percent pebbles, 5 percent cobbles; slightly acid; gradual wavy boundary.

B2t—7 to 15 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate fine and medium angular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, medium, and coarse roots; many very fine, fine, and medium tubular pores; common thin and moderately thick clay films on ped faces and coating coarse fragments; 25 percent pebbles, 25 percent cobbles; slightly acid; abrupt irregular boundary.

R—15 inches; hard fractured rhyolitic bedrock.

The depth of the solum to bedrock ranges from 10 to 20 inches. The mollic epipedon is 7 to 20 inches thick and includes part or all of the argillic horizon. Reaction throughout the profile is slightly acid to mildly alkaline. The control section is clay loam that is 27 to 35 percent clay. It is 35 to 75 percent rock fragments.

Fettic Series

The Fettic series consists of very deep, poorly drained soils on low terraces. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Fettic loam, 600 feet west and 1,000 feet south of the northeast corner of sec. 20, T. 21 N., R. 18 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine and fine interstitial pores; slightly effervescent; moderately alkaline; clear smooth boundary.

B2t—4 to 12 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; strong fine and medium prismatic structure parting to strong fine angular blocky; hard, firm, sticky and plastic; many very fine to medium roots; many very fine and fine interstitial pores; common thin clay films in pores; strongly effervescent; strongly alkaline; abrupt smooth boundary.

B3ca—12 to 20 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and slightly plastic; common fine and very fine and many medium roots; many fine and very fine tubular pores; few thin clay films in pores; violently effervescent; very strongly alkaline; clear smooth boundary.

C1ca—20 to 45 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, slightly sticky and slightly plastic; many very fine to medium roots in pockets; few fine tubular pores; violently effervescent; strongly alkaline; abrupt smooth boundary.

IIC2—45 to 60 inches; very pale brown (10YR 7/3) fine sandy loam, light yellowish brown (2.5Y 6/4) moist; massive; hard, friable, slightly sticky and slightly plastic; very few roots; very few tubular pores; slightly effervescent; moderately alkaline.

The solum is 16 to 32 inches thick. The mollic epipedon is 7 to 14 inches thick and includes part or all of the argillic horizon. Reaction throughout the profile ranges from moderately alkaline to very strongly alkaline. The argillic horizon is clay loam that is 27 to 35 percent clay. It is less than 15 percent fine sand and coarser sand. The exchangeable bases are 30 to 60 percent sodium.

Fireball Series

The Fireball series consists of deep, well drained soils that formed in residuum of basalt. These soils are on uplands. Slopes are 30 to 50 percent.

Typical pedon of Fireball extremely stony fine sandy loam in an area of Osobb-Rezave-Fireball association, 600 feet south and 800 feet west of the northeast corner of sec. 30, T. 23 N., R. 25 E.

A1—0 to 3 inches; light brownish gray (10YR 6/2) extremely stony fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine tubular pores; 20 percent stones, 10 percent cobbles; strongly effervescent; moderately alkaline; clear wavy boundary.

B1—3 to 10 inches; light yellowish brown (2.5Y 6/4) very cobbly fine sandy loam, olive brown (2.5Y 4/4) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine through medium roots; many very fine and fine tubular pores; 15 percent pebbles, 20 percent cobbles, 5 percent stones; few thin clay films coating rock fragments; slightly effervescent; moderately alkaline; gradual wavy boundary.

B2tca—10 to 24 inches; light yellowish brown (2.5Y 6/4) very gravelly loam, olive brown (2.5Y 4/4) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine through medium roots; many very fine and fine tubular pores; 30 percent pebbles, 10 percent cobbles; few thin clay films on faces of peds, in pores, and coating rock fragments; strongly effervescent; very strongly alkaline; clear wavy boundary.

C1ca—24 to 47 inches; white (10YR 8/2) extremely cobbly loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; few fine tubular pores; 25 percent pebbles, 25 percent cobbles, 10 percent stones; violently effervescent; very strongly alkaline; abrupt wavy boundary.

R—47 inches; hard, unweathered basalt.

The depth to the lithic contact is 40 to 60 inches. The solum thickness ranges from 16 to 30 inches. The A horizon is moderately alkaline or strongly alkaline. The B2t horizon is strongly alkaline or very strongly alkaline. It is loam, clay loam, or sandy clay loam that is 18 to 35 percent clay. It is 35 to 60 percent rock fragments. The C horizon is strongly alkaline or very strongly alkaline.

Fleischmann Series

The Fleischmann series consists of moderately deep, well drained soils on terraces. These soils formed in alluvium derived mainly from mixed rock. Slopes are 2 to 15 percent.

Typical pedon of Fleischmann gravelly clay loam, 2 to 4 percent slopes, 300 feet east and 2,500 feet south of the northwest corner of sec. 32, T. 20 N., R. 20 E.

A1—0 to 4 inches; grayish brown (10YR 5/2) gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, firm, sticky and slightly plastic; many very fine to medium roots; many very fine to medium pores; about 15 percent gravel; slightly acid; clear smooth boundary.

B1—4 to 10 inches; brown (10YR 5/3) heavy clay loam, dark brown (10YR 3/3) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common very fine to medium roots; common fine to medium pores; common thin clay films on ped faces; neutral; abrupt wavy boundary.

B2t—10 to 20 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure; very hard, very firm, sticky and plastic; very few roots; very few pores; many moderately thick clay films on ped faces; neutral; abrupt smooth boundary.

C1sim—20 to 43 inches; strongly silica-cemented duripan with some strongly cemented lamellae.

IIC2—43 to 60 inches; light yellowish brown (10YR 6/4) semiconsolidated old alluvial fill and weathered softly consolidated conglomerate with apparent texture of sandy loam to very gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; massive; very hard, firm but very firm in about 25 percent of the area; moderately alkaline.

The thickness of the solum and the depth to the strongly cemented duripan are 20 to 30 inches.

Reaction in the A horizon is commonly slightly acid or neutral but is medium acid in some pedons. The B horizon is slightly acid or neutral. The texture of the Bt horizon is clay that is 40 to 55 percent clay.

Flex Series

The Flex series consists of very shallow, well drained soils on uplands. These soils formed in residuum mainly of altered andesite and metamorphic rock. Slopes are 8 to 50 percent.

Typical pedon of Flex very gravelly sandy loam, 15 to 30 percent slopes, 2,600 feet west and 2,600 feet south of the northeast corner of sec. 22., T. 20 N., R. 19 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; very few roots; many very fine interstitial pores; 35 percent pebbles; slightly acid; abrupt smooth boundary.

A12—1 to 3 inches; light brownish gray (10YR 6/2) very gravelly fine sandy loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 35 percent pebbles; slightly acid; clear smooth boundary.

B1t—3 to 5 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; weak medium angular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; common thin clay films bridging sand grains, 35 percent pebbles; slightly acid; clear smooth boundary.

B2t—5 to 10 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; weak fine angular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine tubular pores; common thin clay films on ped faces, in pores, and bridging sand grains; 35 to 40 percent pebbles; slightly acid; clear wavy boundary.

Cr—10 to 30 inches; highly weathered metavolcanic bedrock.

The solum ranges from 6 to 12 inches in thickness, and the depth to weathered bedrock ranges from 6 to 12 inches. Reaction in the profile is slightly acid or neutral. The control section is very gravelly sandy loam or very gravelly sandy clay loam that is 18 to 27 percent clay. It is 35 to 50 percent pebbles.

Fraval Series

The Fraval series consists of moderately deep, well drained soils on uplands. These soils formed in residuum mainly of volcanic rocks. Slopes are 30 to 50 percent.

Typical pedon of Fraval very stony loam, in an area of Fraval-Booford-Jumbo association, 2,600 feet east and 200 feet north of the southwest corner of sec. 21, T. 18 N., R. 19 E.

A1—0 to 9 inches; dark grayish brown (10YR 4/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine to medium roots; many very fine and fine interstitial pores; 10 percent pebbles, 5 percent cobbles, 3 percent stones; slightly acid; clear smooth boundary.

B2t—9 to 18 inches; brown (10YR 5/3) very gravelly heavy loam, brown (10YR 4/3) moist; weak fine angular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine to

medium roots; many very fine to medium tubular pores; common thin clay films bridging sand grains and few thin clay films in pores; 25 percent pebbles, 10 percent cobbles; slightly acid; gradual wavy boundary.

B3t—18 to 27 inches; light yellowish brown (10YR 6/4) very cobbly loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; many fine and medium roots; 10 percent pebbles, 30 percent cobbles, all highly weathered; few thin clay films bridging sand grains; slightly acid; gradual irregular boundary.

Cr—27 to 40 inches; highly weathered tuff.

Depth to weathered bedrock ranges from 20 to 40 inches. Reaction throughout the profile is medium acid to slightly acid. The B2t horizon is loam or clay loam that is 20 to 30 percent clay. It is 35 to 45 percent rock fragments.

Frodo Series

The Frodo series consists of shallow, well drained soils that formed in residuum and colluvium derived mainly from basalt. Frodo soils are on remnants of volcanic flow rock plateaus. Slopes are 2 to 30 percent.

Typical pedon of Frodo very stony loam, in an area of Frodo-Xman-Oppio association, 900 feet west and 500 feet south of the northeast corner of sec. 32, T. 21 N., R. 21 E.

A11—0 to 1 inch; dark grayish brown (10YR 4/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak moderate subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine and fine tubular pores; 10 percent pebbles, 30 percent cobbles, 25 percent stones; neutral; abrupt smooth boundary.

A12—1 to 6 inches; dark grayish brown (10YR 4/2) loam, dark brown (10YR 3/3) moist; strong medium subangular blocky structure parting to weak thin and medium platy; slightly hard, very friable, sticky and plastic; many very fine and fine tubular pores; 5 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

B2t—6 to 16 inches; brown (10YR 4/3) clay, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to strong medium subangular blocky; extremely hard, firm, very sticky and very plastic; common very fine and fine roots; few very fine and fine tubular pores; continuous, moderately thick clay films on ped faces; 5 percent stones; mildly alkaline; clear smooth boundary.

B3tca—16 to 18 inches; dark yellowish brown (10YR 4/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium to fine angular blocky structure; very hard, firm, sticky and plastic; common very fine and fine roots; few very fine and fine tubular pores; 25 percent pebbles; moderately effervescent; moderately alkaline; abrupt smooth boundary.

C1casim—18 to 23 inches; very pale brown (10YR 7/3) continuous strongly silica-cemented duripan, pale brown (10YR 6/3) moist; massive; extremely hard; strongly effervescent; moderately alkaline; clear wavy boundary.

R—23 to 42 inches; hard, fractured bedrock.

The depth of the solum to the duripan ranges from 14 to 20 inches. The depth to bedrock ranges from 18 to 30 inches. The A horizon is slightly acid or neutral. The B horizon is neutral to moderately alkaline. The Bt horizon is clay or clay loam that is 35 to 60 percent clay. It is 5 to 25 percent rock fragments.

Fugawee Series

The Fugawee series consists of moderately deep, well drained soils on uplands. These soils formed in residuum mainly of volcanic rock. Slopes are 15 to 50 percent.

Typical pedon of Fugawee very stony loam, in an area of Jorge-Boomtown-Fugawee association, 600 feet west and 2,000 feet north of the southeast corner of sec. 9, T. 18 N., R. 18 E.

O1—2 inches to 0; pine and fir litter duff.

A11—0 to 5 inches; dark grayish brown (10YR 4/2) very stony sandy loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine through coarse roots; many very fine through medium tubular pores; 15 percent pebbles, 10 percent cobbles, 15 percent stones; strongly acid; clear wavy boundary.

A12—5 to 17 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine through coarse roots; many very fine through medium tubular pores; 20 percent pebbles, 5 percent cobbles, 5 percent stones; medium acid; clear smooth boundary.

B2t—17 to 29 inches; light yellowish brown (10YR 6/4) cobbly loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine through coarse roots; many very fine through medium tubular pores; few thin clay films on ped faces and pores; 15 percent pebbles, 15 percent cobbles; medium acid; clear smooth boundary.

C1r—29 to 43 inches; highly weathered volcanic rock.

The depth of the solum to weathered bedrock ranges from 20 to 40 inches. The surface horizon does not

qualify as an umbric epipedon. Reaction throughout the profile is medium acid to strongly acid. The Bt horizon is loam or clay loam that is 18 to 35 percent clay. It is 5 to 35 percent rock fragments.

Gabica Series

The Gabica series consists of shallow, well drained soils on uplands. These soils formed in residuum mainly of volcanic rock. Slopes are 8 to 30 percent.

Typical pedon of Gabica very gravelly sandy loam, 8 to 30 percent slopes, 400 feet east and 2,400 feet north of the southwest corner of sec. 33, T. 16 N., R. 19 E.

A11—0 to 1 inch; dark grayish brown (10YR 4/2) very gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 50 percent pebbles, 5 percent cobbles; slightly acid; clear smooth boundary.

A12—1 to 9 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine tubular pores; 35 percent pebbles, 5 percent cobbles, 5 percent stones; slightly acid; clear wavy boundary.

A13—9 to 14 inches; grayish brown (10YR 5/2) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, friable, slightly sticky and slightly plastic; common very fine to medium roots; few fine pores; few thin clay films coating coarse fragments; 10 percent pebbles, 50 percent cobbles; slightly acid; abrupt irregular boundary.

B2t—14 to 19 inches; dark yellowish brown (10YR 4/4) very cobbly clay loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; very few roots; few thin clay films coating coarse fragments and in pores; 10 percent pebbles, 50 percent cobbles; slightly acid; abrupt irregular boundary.

R—19 to 22 inches; hard, fractured porphyritic bedrock.

The thickness of the solum and the depth to unweathered bedrock range from 10 to 20 inches. The mollic epipedon is 7 to 19 inches thick. Reaction throughout the profile ranges from neutral to medium acid. The Bt horizon is clay loam, silty clay loam, or heavy loam that is 24 to 35 percent clay. It is 50 to 80 percent rock fragments.

Galeppi Series

The Galeppi series consists of very deep, well drained soils on dissected alluvial fans and terraces. These soils formed in alluvium derived mainly from granitic and sedimentary rocks. Slopes are 4 to 30 percent.

Typical pedon of Galeppi sandy loam, 4 to 8 percent slopes, 1,000 feet east and 1,800 feet north of the southwest corner of sec. 7, T. 22 N., R. 19 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; many very fine to medium roots; many fine interstitial pores; slightly acid; abrupt smooth boundary.

A12—2 to 10 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine to coarse roots; many fine interstitial and tubular pores; 5 percent cobbles; neutral; clear smooth boundary.

B2t—10 to 15 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure; very hard, friable, sticky and plastic; many very fine to coarse roots; common fine tubular pores; common thin clay films on ped faces and in pores; neutral; clear smooth boundary.

IIB3t—15 to 22 inches; yellowish brown (10YR 5/4) heavy sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; common thin clay films in pores; neutral; gradual smooth boundary.

IIC1si—22 to 35 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; hard, firm, nonsticky and nonplastic; few coarse roots; weak discontinuous silica cementation; neutral; abrupt smooth boundary.

IIIC2si—35 to 60 inches; light brownish gray (2.5Y 6/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, nonsticky and nonplastic; few coarse roots; weak discontinuous silica cementation; neutral.

The depth of the solum to the weakly silica-cemented layer ranges from 21 to 39 inches. The mollic epipedon is 8 to 15 inches thick. The reaction throughout the profile is slightly acid to mildly alkaline. The B2t horizon is sandy clay loam or clay loam and averages 22 to 30 percent clay.

Glenbrook Series

The Glenbrook series consists of shallow, somewhat excessively drained soils on uplands. These soils formed in material weathered mainly from granite and granodiorite. Slopes are 8 to 70 percent.

Typical pedon of Glenbrook cobbly sand in an area of Graufels-Glenbrook complex, 8 to 50 percent slopes, 1,800 feet east and 400 feet north of the southwest corner of sec. 7, T. 23 N., R. 19 E.

About 20 percent of the surface is covered by cobbles that broke off from adjacent apatite dikes.

A11—0 to 2 inches; pale brown (10YR 6/3) cobbly sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; very few roots; many very fine interstitial pores; 15 percent fine pebbles, 15 percent cobbles; slightly acid; clear smooth boundary.

A12—2 to 7 inches; grayish brown (10YR 5/2) cobbly sand, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine to medium roots; many very fine and fine interstitial pores; 15 percent pebbles, 10 percent cobbles; slightly acid; clear smooth boundary.

C1—7 to 13 inches; pale brown (10YR 6/3) gravelly sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; common very fine to coarse roots; many very fine and fine interstitial pores; 15 percent pebbles, 10 percent cobbles; slightly acid; abrupt wavy boundary.

C2r—13 to 24 inches; weathered granodiorite; original rock structure is evident; the rock can be dug with a tile spade to a depth of about 4 feet.

The depth to weathered granitic bedrock is 10 to 20 inches. Depth to extremely hard bedrock ranges from 24 to more than 72 inches. Reaction throughout the profile ranges from slightly acid to neutral. The control section is sand, coarse sand, or loamy sand that is 0 to 8 percent clay. The content of rock fragments ranges from 15 to 30 percent.

Godecke Series

The Godecke series consists of very deep, somewhat poorly drained soils on terraces. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 2 percent.

Typical pedon of Godecke loamy sand, 330 feet east and 1,650 feet south of the northwest corner of sec. 8, T. 16 N., R. 20 E.

A1—0 to 2 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; many interstitial pores; neutral; clear smooth boundary.

A2—2 to 5 inches; light brownish gray (10YR 6/2) loamy fine sand, brown (10YR 4/3) moist; weak fine platy structure; slightly hard, very friable, nonsticky and nonplastic; many very fine to coarse roots; many very fine to coarse tubular pores; moderately alkaline; clear wavy boundary.

B2t—5 to 10 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; very dark brown (10YR 2/2) organic stains on ped faces; moderate medium prismatic structure; very hard, firm, sticky and plastic; common very fine and fine roots concentrated along ped faces; common very fine tubular pores; common moderately thick clay films on ped faces and few moderately thick clay films in pores; strongly alkaline; clear wavy boundary.

B3t—10 to 15 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure; very hard, firm, sticky and plastic; common very fine and fine roots; common very fine tubular pores; few thin clay films on ped faces and common thin clay films in pores; slightly effervescent, some lime occurs in solid masses; strongly alkaline; clear wavy boundary.

C1—15 to 25 inches; light brownish gray (2.5Y 6/2) light sandy clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; few fine to coarse roots; few very fine and fine tubular pores; slightly effervescent, lime in soft masses; strongly alkaline; clear wavy boundary.

IIB22tcasi—25 to 33 inches; pale brown (10YR 6/3) light clay, brown (10YR 4/3) moist; weak medium prismatic structure; very hard, firm, very sticky and plastic; common fine to coarse dead roots; few fine and medium pores; common moderately thick clay films on ped faces and in pores; strongly effervescent, lime in filaments; few small durinodes; strongly alkaline; clear wavy boundary.

IIC2casi—33 to 43 inches; pale brown (10YR 6/3) sandy loam with weakly silica-cemented lamellae, yellowish brown (10YR 5/4) moist; common fine distinct yellowish brown (10YR 5/6) mottles; slightly hard and very hard, friable and brittle, slightly sticky and slightly plastic; strongly effervescent, lime in filaments; strongly alkaline; abrupt wavy boundary.

IIC3ca—43 to 60 inches; pale brown (10YR 6/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, sticky and slightly plastic; strongly effervescent, lime in thin filaments; moderately alkaline.

The solum ranges from 14 to 20 inches in thickness. Reaction is moderately alkaline to strongly alkaline throughout. The Bt horizon is clay loam or sandy clay loam and averages between 20 and 35 percent clay. The exchangeable bases range from 15 to 35 percent sodium. These soils are generally dry except in late winter and spring when they are moist throughout. The water table is within 40 inches of the surface during the rest of the year. These soils are slightly to strongly affected by salts and alkali. Some pedons are calcareous throughout.

Godecke Variant

The Godecke Variant consists of deep, moderately well drained soils on alluvial fans. These soils formed in

alluvium derived from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Godecke Variant loamy sand, 2,500 feet west and 800 feet north of the southwest corner of sec. 8, T. 16 N., R. 20 E.

A11—0 to 5 inches; brown (10YR 5/3) loamy sand, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; many interstitial pores; neutral; clear smooth boundary.

A12—5 to 12 inches; light brownish gray (10YR 6/2) fine sandy loam, brown (10YR 4/3) moist; weak thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine to coarse roots; many very fine to coarse tubular pores; moderately alkaline; clear wavy boundary.

B2t—12 to 25 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure; very hard, firm, sticky and plastic; common very fine and fine roots concentrated along ped faces; common very fine tubular pores; common moderately thick clay films on ped faces and few moderately thick clay films in pores; strongly alkaline; clear wavy boundary.

C1sica—25 to 42 inches; light brownish gray (10YR 6/2) light sandy clay loam, dark grayish brown (10YR 4/2) moist; massive; hard, firm, sticky and plastic; few fine to coarse roots; few very fine and fine tubular pores; lime in soft masses; weak silica cementation; slightly effervescent; strongly alkaline; clear wavy boundary.

C2sim—42 to 60 inches; white (10YR 8/2) strongly cemented duripan.

The depth to the duripan is 40 to 60 inches. The A horizon ranges from neutral to moderately alkaline. The B2t horizon is sandy clay loam that is 20 to 35 percent clay. The depth to the water table is 6 to 7 feet.

Graufels Series

The Graufels series consists of moderately deep, somewhat excessively drained soils on uplands. These soils formed in residuum derived mainly from granitic rocks. Slopes are 4 to 50 percent.

Typical pedon of Graufels bouldery sand, in an area of Graufels-Rock outcrop complex, 15 to 30 percent slopes, 600 feet west and 700 feet north of the southeast corner of sec. 30, T. 17 N., R. 20 E.

A11—0 to 3 inches; dark grayish brown (10YR 4/2) bouldery sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; very few roots; many fine and very fine interstitial pores; 20 percent fine pebbles, 2 percent boulders; neutral; abrupt smooth boundary.

A12—3 to 10 inches; grayish brown (10YR 5/2) loamy coarse sand, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots; many very fine and fine interstitial pores; 10 percent fine pebbles; neutral; gradual smooth boundary.

C1—10 to 22 inches; light yellowish brown (10YR 6/4) gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine to medium roots; common very fine and medium interstitial and few very fine and medium tubular pores; very few thin clay films coating and bridging sand grains; 25 percent fine pebbles; neutral; clear wavy boundary.

C2r—22 to 24 inches; highly weathered granodiorite bedrock that can be dug relatively easily with hand tools.

The depth to weathered bedrock is 20 to 40 inches. Reaction throughout the profile is slightly acid to neutral. The control section is sand, loamy sand, gravelly coarse sand, or gravelly loamy sand that is 3 to 10 percent clay. Some pedons have strata that are 10 to 35 percent coarse fragments.

Graylock Series

The Graylock series consists of deep, somewhat excessively drained soils on uplands. These soils formed in residuum mainly of granitic rocks. Slopes are 30 to 70 percent.

Typical pedon of Graylock bouldery loamy sand, in an area of Graylock-Temo-Rock outcrop complex, 1,100 feet west and 2,200 feet south of the northeast corner of sec. 20, T. 17 N., R. 19 E.

A1—0 to 10 inches; grayish brown (10YR 5/2) bouldery loamy sand, dark grayish brown (10YR 4/2) moist; single grained; loose, nonsticky and nonplastic; many fine and very fine and few medium roots; many very fine interstitial pores; 10 percent pebbles, 10 percent stones and boulders; medium acid; clear wavy boundary.

AC—10 to 20 inches; brown (10YR 5/3) very gravelly loamy sand, dark brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; many fine and medium and few very fine roots; many fine interstitial pores; 50 percent pebbles, 5 percent cobbles; medium acid; gradual wavy boundary.

C1—20 to 41 inches; pale brown (10YR 6/3) very gravelly loamy sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; many fine interstitial pores; 40 percent pebbles, 10 percent cobbles, 5 percent stones; medium acid; gradual wavy boundary.

C2—41 to 60 inches; pale brown (10YR 6/3) very cobbly loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; very few roots; many fine interstitial pores; 30 percent pebbles, 15 percent cobbles, 5 percent stones; medium acid; clear irregular boundary.
C3r—60 to 61 inches; highly fractured granitic bedrock.

The depth to bedrock ranges from 40 to 60 inches. Reaction throughout the profile ranges from slightly acid to very strongly acid. The control section is loamy sand or sand that is 0 to 5 percent clay. It is 50 to 75 percent rock fragments.

Greenbrae Series

The Greenbrae series consists of very deep, well drained soils on smooth terraces and alluvial fans. These soils formed in alluvium derived mainly from granodiorite. Slopes are 0 to 8 percent.

Typical pedon of Greenbrae sandy loam, 0 to 2 percent slopes, 200 feet west and 1,000 feet south of the northeast corner of sec. 24, T. 21 N., R. 18 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) loamy sand, very dark brown (10YR 2/2) moist; massive; soft, very friable; many very fine interstitial pores; medium acid; abrupt smooth boundary.
A12—2 to 5 inches; grayish brown (10YR 5/2) sandy loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores; slightly acid; clear wavy boundary.
A13—5 to 10 inches; grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; many very fine interstitial pores; slightly acid; abrupt wavy boundary.
B21t—10 to 17 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; common thin clay films on peds; slightly acid; abrupt wavy boundary.
B22t—17 to 30 inches; brown (10YR 5/3) sandy clay, very dark grayish brown (10YR 3/2) moist; strong fine prismatic structure; very hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many thin and few moderately thick clay films on peds and in pores; neutral; abrupt wavy boundary.
B3—30 to 41 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 4/3) moist; massive; very hard, friable, nonsticky and slightly plastic; few very fine roots; few very fine tubular pores; few thin clay films coating and bridging sand grains; neutral; clear wavy boundary.
IIC1—41 to 62 inches; light yellowish brown (10YR 6/4) gravelly fine sandy loam, brown (10YR 5/3) moist; massive; very hard, friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 15 percent pebbles; neutral; abrupt wavy boundary.

The solum ranges from 28 to 48 inches in thickness. Reaction throughout the profile ranges from medium acid to mildly alkaline. The Bt horizon is clay loam, sandy clay loam, or sandy clay. The clay content averages 27 to 35 percent.

Hawsley Series

The Hawsley series consists of very deep, somewhat excessively drained soils that formed in alluvium and water-reworked eolian deposits derived from mixed rock. Hawsley soils are on fans and terraces. Slopes are 2 to 8 percent.

Typical pedon of Hawsley sand, 2 to 8 percent slopes, 1,000 feet north and 800 feet west of sec. 6, T. 23 N., R. 24 E.

A11—0 to 4 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; many very fine and fine interstitial pores; 5 percent pebbles; moderately alkaline; clear smooth boundary.
A12—4 to 8 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine interstitial and few fine tubular pores; 5 percent pebbles; moderately alkaline; clear smooth boundary.
C1—8 to 23 inches; pale brown (10YR 6/3) stratified fine sand through coarse sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine interstitial and few fine tubular pores; 5 percent pebbles; strongly alkaline; clear smooth boundary.
C2ca—23 to 42 inches; pale brown (10YR 6/3) stratified fine sand through coarse sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine interstitial and few fine tubular pores; 5 percent pebbles; strongly effervescent; strongly alkaline; clear smooth boundary.
IIC2ca—42 to 60 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; common very fine and fine interstitial and few fine tubular pores; 10 percent gravel; strongly effervescent; strongly alkaline.

This soil is more than 60 inches deep. Reaction in the A horizon is neutral to moderately alkaline and in the C horizon ranges from mildly alkaline to strongly alkaline. The control section (between depths of 10 inches and 40 inches) is stratified fine sand through coarse sand that is 0 to 5 percent clay. Gravel content ranges from 0 to 15 percent in all strata.

Haybourne Series

The Haybourne series consists of very deep, well drained soils on smooth to convex alluvial fans. These soils formed in mixed alluvium derived from granitic rocks. Slopes are 2 to 15 percent.

Typical pedon of Haybourne loamy sand, 2 to 4 percent slopes, 1,800 feet east and 1,700 feet south of the northwest corner of sec. 15, T. 21 N., R. 19 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; slightly acid; abrupt wavy boundary.

A12—2 to 7 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores; mildly alkaline; abrupt wavy boundary.

A13—7 to 10 inches; light brownish gray (10YR 6/2) fine sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and few fine and medium roots; many very fine interstitial and few fine tubular pores; mildly alkaline; abrupt wavy boundary.

B21—10 to 17 inches; yellowish brown (10YR 5/4) sandy loam, dark brown (10YR 3/3) moist; weak fine to medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine to coarse roots; many very fine interstitial and few fine tubular pores; 10 percent fine pebbles; few thin clay films coating and bridging sand grains; mildly alkaline; clear wavy boundary.

B22—17 to 26 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 3/3) moist; weak fine to medium subangular blocky structure; very hard, friable, nonsticky and nonplastic; few very fine to coarse roots; many very fine interstitial and few fine tubular pores; 10 percent fine pebbles; few thin clay films coating and bridging sand grains; mildly alkaline; clear wavy boundary.

C1—26 to 38 inches; pale brown (10YR 6/3) sandy loam, dark grayish brown (10YR 4/2) moist; massive; very hard, friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial and few fine tubular pores; 10 percent fine pebbles; noneffervescent matrix but slightly effervescent in spots; moderately alkaline; abrupt wavy boundary.

C2—38 to 63 inches; light brownish gray (10YR 6/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; 10 percent fine pebbles; mildly alkaline.

The solum ranges from 18 to 32 inches in thickness. Reaction throughout the profile is slightly acid to moderately alkaline. The texture in the control section (between a depth of 10 inches and a depth of 40 inches) is fine sandy loam or sandy loam that is 5 to 18 percent clay. It is 10 to 25 percent fine pebbles.

Haypress Series

The Haypress series consists of deep, somewhat excessively drained soils on uplands. These soils formed in materials derived mainly from granitic rocks. Slopes are 15 to 70 percent.

Typical pedon of Haypress extremely bouldery loamy coarse sand, in an area of Haypress-Tanob-Rock outcrop association, 1,030 feet west and 150 feet north of the southeast corner of sec. 29, T. 22 N., R. 18 E.

A11—0 to 4 inches; dark grayish brown (10YR 4/2) extremely bouldery loamy coarse sand, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; 20 percent pebbles, 15 percent stones, 30 percent boulders; medium acid; clear smooth boundary.

A12—4 to 15 inches; grayish brown (10YR 5/2) gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 20 percent fine pebbles; slightly acid; clear wavy boundary.

AC—15 to 28 inches; brown (10YR 5/3) gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 20 percent fine pebbles, 5 percent cobbles; slightly acid; clear irregular boundary.

C1—28 to 40 inches; brown (10YR 5/3) gravelly coarse sand, dark grayish brown (2.5Y 4/2) moist; single grained; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 30 percent fine pebbles; slightly acid; abrupt irregular boundary.

C2r—40 to 46 inches; highly weathered granodiorite with soil and roots in fractures.

The depth to weathered bedrock ranges from 40 to 60 inches. The mollic epipedon is 10 to 18 inches thick.

Reaction throughout the profile is medium acid to slightly acid. Texture in the control section is gravelly coarse sand, coarse sand, loamy coarse sand, or gravelly loamy coarse sand that is 0 to 8 percent clay.

Rock fragments make up 15 to 35 percent of the control section and are mostly pebbles.

Hefed Series

The Hefed series consists of very deep, well drained soils that formed in mixed colluvium derived mainly from metavolcanic sources. Hefed soils are on lower colluvial slopes. Slopes are 15 to 70 percent.

Typical pedon of Hefed very stony sandy loam, in an area of Bombadil-Hefed-Rubble land association, 100 feet south and 2,500 feet west of the northeast corner of sec. 18, R. 23 E., T. 20 N.

A1—0 to 2 inches; pale brown (10YR 6/3) very stony sandy loam, dark brown (10YR 3/3) moist; moderate thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine vesicular pores and common fine tubular pores; 20 percent pebbles, 15 percent cobbles; 15 percent stones; neutral; abrupt smooth boundary.

B2t—2 to 6 inches; brown (10YR 5/3) very gravelly loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine to medium roots; many fine to very fine vesicular and tubular pores; common thin and few moderately thick clay films on peds, in pores, and on rock fragments; 35 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

B3t—6 to 13 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; few medium and common very fine and fine roots; common very fine and fine tubular pores; few medium tubular pores; common thin clay films in pores and coating rock fragments; 40 percent pebbles, 5 percent cobbles; neutral; gradual wavy boundary.

C1—13 to 24 inches; pale brown (10YR 6/3) very cobbly sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine through medium roots; few very fine through medium tubular pores; 25 percent pebbles, 20 percent cobbles, 5 percent stones; mildly alkaline; gradual wavy boundary.

IIC2—24 to 51 inches; pale brown (10YR 6/3) very cobbly loamy fine sand; dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine and fine tubular pores; 20 percent pebbles, 15 percent cobbles, 10 percent stones; mildly alkaline; abrupt wavy boundary.

IIIC3sica—51 to 62 inches; yellowish brown (10YR 5/4) very cobbly loamy sand, dark yellowish brown (10YR 3/4) moist; massive; very hard, brittle, nonsticky and nonplastic; strongly effervescent in spots; 30 percent pebbles, 25 percent cobbles, 5 percent stones; continuous weak silica cementation; moderately alkaline; abrupt wavy boundary.

IVC4ca—62 to 75 inches; brown (10YR 5/3) very gravelly loamy sand, dark yellowish brown (10YR 3/4) moist; massive; very hard, friable, nonsticky and nonplastic; very few fine roots; very few fine tubular pores; strongly effervescent with lime occurring in seams; 50 percent pebbles, 10 percent cobbles; moderately alkaline.

The depth of the solum ranges from 10 to 20 inches. Reaction throughout the profile is neutral to moderately alkaline.

The Bt horizon is loam or heavy sandy loam that is 18 to 27 percent clay. It is 35 to 50 percent rock fragments.

Hirschdale Series

The Hirschdale series consists of moderately deep, well drained soils formed in residuum of altered andesite. Hirschdale soils are on uplands. Slopes are 15 to 50 percent.

Typical pedon of Hirschdale very stony loam, in an area of Fraval-Hirschdale-Duckhill Variant association, 800 feet west and 1,200 feet south of the northwest corner of sec. 6, T. 18 N., R. 19 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 10 percent pebbles, 10 percent cobbles, 15 percent stones; neutral; abrupt smooth boundary.

A12—2 to 6 inches; brown (7.5YR 5/2) cobbly loam, dark brown (7.5YR 3/2) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine through medium roots; common fine and medium vesicular pores; 10 percent pebbles, 10 percent cobbles, 3 percent stones; neutral; clear smooth boundary.

B21t—6 to 12 inches; reddish brown (5YR 5/4) gravelly clay loam, reddish brown (5YR 4/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine tubular pores; few very fine through coarse roots; common moderately thick clay films on ped faces and pores; 15 percent pebbles, 5 percent cobbles; neutral; abrupt smooth boundary.

B22t—12 to 39 inches; reddish brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist; moderate medium

prismatic structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; many thick clay films coating rock fragments and on ped faces and pores; 5 percent pebbles, 5 percent cobbles; slightly acid; clear wavy boundary.

Cr—39 to 55 inches; highly weathered altered and bleached andesite with roots and clay loam in pockets.

R—55 inches; hard bleached and altered andesite.

The thickness of the solum and the depth to the paralithic contact range from 20 to 40 inches. Reaction throughout the profile is neutral to slightly acid. The Bt horizon is clay loam or clay that averages 35 to 60 percent clay. It is 10 to 35 percent rock fragments.

Holbrook Series

The Holbrook series consists of very deep, somewhat excessively drained soils on alluvial fans and in drainageways. These soils formed in alluvium derived from mixed rock. Slopes are 2 to 8 percent.

Typical pedon of Holbrook gravelly loamy sand, 2 to 8 percent slopes, 2,640 feet west and 1,400 feet south of the northeast corner of sec. 5, T. 16 N., R. 20 E.

A1—0 to 8 inches; brown (10YR 5/3) gravelly loamy sand, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; 30 percent pebbles; slightly acid; clear smooth boundary.

B2—8 to 14 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 20 percent pebbles; slightly acid; clear smooth boundary.

C1—14 to 60 inches; light brownish gray (10YR 6/2) stratified very gravelly fine sandy loam, gravelly sand, and very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; 35 percent pebbles, 5 percent cobbles; slightly acid; clear smooth boundary.

The solum ranges from 12 to 20 inches in thickness. The soil profile is more than 60 inches deep. The mollic epipedon is 10 to 20 inches thick and includes part or all of the cambic horizon. Reaction throughout the profile is slightly acid to moderately alkaline. Texture in the control section (between depths of 10 inches and 40 inches) averages sandy loam. It is 5 to 10 percent clay and is 35 to 50 percent rock fragments.

Idlewild Series

The Idlewild series consists of very deep, somewhat poorly drained soils on alluvial fans and terraces. These soils formed in alluvium derived mainly from mixed rock. Slopes are 0 to 2 percent.

Typical pedon of Idlewild clay loam, 1,400 feet west and 660 feet south of the northeast corner of sec. 6, T. 19 N., R. 20 E.

A11—0 to 4 inches; grayish brown (2.5Y 5/2) heavy loam, very dark grayish brown (2.5Y 3/2) moist; many large prominent reddish brown (5YR 4/4) mottles; moderate medium angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine to medium pores; slightly acid; clear wavy boundary.

A12—4 to 8 inches; dark grayish brown (2.5Y 4/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; many large prominent reddish brown (5YR 4/4) mottles; weak fine prismatic structure; friable, slightly sticky and plastic; many very fine and fine roots; many very fine and fine pores; slightly acid; clear smooth boundary.

B1—8 to 13 inches; olive brown (2.5Y 4/4) clay loam, olive brown (2.5Y 4/4) moist; many large prominent brown (7.5YR 4/4) mottles; massive; firm, sticky and plastic; common very fine and fine roots; common very fine pores; slightly acid; gradual smooth boundary.

B2t—13 to 23 inches; dark yellowish brown (10YR 4/4) silty clay, olive brown (2.5Y 4/4) moist; many large prominent brown (7.5YR 4/4) mottles; weak coarse prismatic structure; very firm, sticky and very plastic; few very fine roots; common very fine pores; common thin clay films on ped faces; few thin clay films in pores; some manganese concretions; slightly acid; clear wavy boundary.

B3t—23 to 36 inches; olive brown (2.5Y 4/4) heavy silty clay loam, olive brown (2.5Y 4/4) moist; many large prominent brown (7.5YR 4/4) mottles; weak medium angular blocky structure; firm, sticky and plastic; very few roots; very few pores; common thin clay films; some manganese concretions; slightly acid; gradual wavy boundary.

C1—36 to 47 inches; yellowish brown (10YR 5/4) silty clay loam, olive brown (2.5Y 4/4) moist; many large prominent brown (7.5YR 4/4) mottles; weak fine angular blocky structure; firm, sticky and plastic; very few roots; very few pores; neutral; clear smooth boundary.

C2—47 to 62 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; few fine faint brown (7.5YR 4/4) mottles; massive; friable, sticky and plastic; very few roots; very few pores; neutral; abrupt wavy boundary.

IIC2—62 to 68 inches; brown (10YR 5/3) gravelly sand, dark yellowish brown (10YR 4/4) moist; single grained; loose, nonsticky and nonplastic; neutral.

The solum ranges from 30 to 40 inches in thickness. Reaction throughout the profile is slightly acid to neutral. The Bt horizon is clay, silty clay, clay loam, or heavy silty clay loam that averages from 35 to 45 percent clay. These soils are saturated at a depth ranging from 20 to 40 inches during a large part of the year, unless the drainage has been altered.

Incy Series

The Incy series consists of very deep, excessively drained soils on alluvial fans and terraces. These soils formed in sandy eolian deposits and alluvium derived from granitic rock with admixtures from rhyolite, andesite, and other rock. Slopes are 4 to 30 percent.

Typical pedon of Incy sand, 4 to 8 percent slopes, 2,340 feet east and 2,640 feet south of the northwest corner of sec. 14, T. 21 N., R. 19 E.

A11—0 to 3 inches; pale brown (10YR 6/3) sand, dark brown (7.5YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; neutral; abrupt wavy boundary.

A12—3 to 9 inches; grayish brown (10YR 5/2) sand, dark brown (7.5YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and large roots; many very fine interstitial pores; neutral; clear wavy boundary.

C1—9 to 26 inches; brown (10YR 5/3) sand, dark brown (7.5YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine to coarse roots; many very fine interstitial pores; neutral; clear wavy boundary.

C2—26 to 67 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; mildly alkaline.

The soil profile is more than 60 inches deep. Reaction throughout the profile is neutral to mildly alkaline. The control section is sand or fine sand. It is 0 to 5 percent clay.

Indian Creek Series

The Indian Creek series consists of shallow, well drained soils on dissected alluvial fans and terraces. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 15 percent.

Typical pedon of Indian Creek gravelly sandy loam, 0 to 4 percent slopes, 400 feet west and 200 feet south of the northeast corner of sec. 8, T. 20 N., R. 19 E.

About 25 percent of the surface is covered by gravel.

A11—0 to 3 inches; grayish brown (10YR 5/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine interstitial pores; 40 percent gravel; neutral; clear smooth boundary.

A12—3 to 7 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine interstitial pores; neutral; clear smooth boundary.

B1t—7 to 11 inches; light brown (7.5YR 6/4) sandy clay loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and plastic; few very fine and fine roots; many very fine interstitial pores; few thin clay films coating and bridging sand grains; neutral; abrupt smooth boundary.

B2t—11 to 16 inches; light brown (7.5YR 6/4) gravelly clay, reddish brown (5YR 5/4) moist; moderate medium prismatic structure; very hard to extremely hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; pressure faces or cutans on peds; few slickensides; 20 percent pebbles; neutral; abrupt smooth boundary.

B3t—16 to 18 inches; light brown (7.5YR 6/4) gravelly clay, reddish brown (5YR 5/4) moist; massive; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; common thin clay films bridging sand grains; 20 percent pebbles; neutral; abrupt smooth boundary.

C1sim—18 to 25 inches; reddish yellow (7.5YR 7/6) strongly silica-cemented hardpan, strong brown (7.5YR 5/6) moist; extremely hard, extremely firm; slightly effervescent in spots; 50 to 60 percent pebbles; neutral; clear smooth boundary.

C2si—25 to 35 inches; reddish yellow (7.5YR 7/6) weakly cemented very gravelly sandy loam, brown (7.5YR 5/4) moist; massive; very hard, very firm, nonsticky and nonplastic; 50 percent pebbles, 10 percent cobbles; slightly effervescent in spots; neutral; gradual smooth boundary.

C3si—35 to 60 inches; light brown (7.5YR 6/4) very gravelly sandy clay loam, strong brown (7.5YR 5/6) moist; massive; very hard, very firm, sticky and plastic; 40 percent pebbles; neutral.

The thickness of the solum and the depth to the strongly silica-cemented hardpan are 14 to 20 inches. Reaction throughout the profile is slightly acid to mildly alkaline. Texture in the argillic horizon averages clay or sandy clay. It is 35 to 55 percent clay and is 5 to 35 percent rock fragments.

Indiano Series

The Indiano series consists of moderately deep, well drained soils on uplands. These soils formed in residuum mainly of metavolcanic and volcanic rock. Slopes are 15 to 50 percent.

Typical pedon of Indiano gravelly loam, 15 to 30 percent slopes, 150 feet west and 475 feet south of the northeast corner of sec. 20, T. 20 N., R. 19 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) very gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 40 percent pebbles; slightly acid; clear smooth boundary.
A12—1 inch to 14 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine to medium interstitial and tubular pores; 10 percent pebbles; slightly acid; clear smooth boundary.
B2t—14 to 29 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure; hard, firm, sticky and plastic; common fine roots; common fine tubular pores; common moderately thick clay films on ped faces; 10 percent pebbles, 5 percent cobbles; slightly acid; abrupt wavy boundary.
R—29 to 40 inches; weathered metamorphic bedrock, becomes hard within 1 inch.

The thickness of the solum and the depth to weathered bedrock range from 20 to 40 inches. The bedrock becomes hard within 40 inches. Reaction throughout the profile is slightly acid to neutral. The Bt horizon is clay loam or sandy clay loam. It is 20 to 35 percent clay and is 15 to 25 percent rock fragments.

Inville Variant

The Inville Variant consists of very deep, somewhat poorly drained soils on terraces, fans, and glacial outwashes. These soils formed in alluvium derived from mixed rock. Slopes are 2 to 8 percent.

Typical pedon of Inville Variant gravelly sandy loam, 2 to 8 percent slopes, 1,300 feet west and 2,500 feet south of the northeast corner of sec. 5, T. 15 N., R. 19 E.

A1—0 to 8 inches; brown (7.5YR 4/4) gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and many very fine roots; many fine interstitial pores; 15 percent pebbles; medium acid; clear smooth boundary.
B2t—8 to 14 inches; brown (7.5YR 4/4) very gravelly loam, dark brown (7.5YR 3/2) moist; weak medium angular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine, common fine and medium, and many coarse roots; many fine interstitial pores; common thin clay films bridging sand grains and few thin clay films on ped faces and in pores; 30 percent pebbles, 5 percent cobbles; medium acid; clear wavy boundary.
B3t—14 to 25 inches; strong brown (7.5YR 5/6) very gravelly sandy loam, strong brown (7.5YR 5/6) moist; few fine prominent olive gray (5Y 5/2) mottles; weak coarse angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; many fine interstitial pores; few thin clay films on ped faces and bridging sand grains; 35 percent pebbles, 5 percent cobbles; medium acid; gradual wavy boundary.
C1—25 to 40 inches; strong brown (7.5YR 5/6) gravelly heavy sandy loam, strong brown (7.5YR 5/6) moist; many large distinct strong brown (7.5YR 5/8) and few fine prominent grayish brown (2.5Y 5/2) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few medium roots; few medium pores; 25 percent pebbles; medium acid; clear smooth boundary.
IIC2—40 to 78 inches; strong brown (7.5YR 5/6) clay loam, about 50 percent strong brown (7.5YR 5/6) mottles and 50 percent olive gray (5Y 5/2) mottles; moist; massive; hard, friable, sticky and slightly plastic; very few roots; very few pores; 5 percent cobbles; medium acid.

The solum ranges from 20 to 30 inches in thickness. Reaction throughout the profile is medium acid to slightly acid. The Bt horizon is very gravelly loam or very gravelly sandy loam. The clay content ranges from 15 to 27 percent, and the content of rock fragments ranges from 35 to 45 percent. The C and IIC horizons are highly mottled and, in many pedons, are gleyed in the lower part.

Isolde Series

The Isolde series consists of very deep, excessively drained soils that formed in eolian sand derived from mixed rock. Isolde soils are on stabilized dunes over lake beds, playas, terraces, alluvial fans, and uplands. Slopes are 0 to 15 percent.

Typical pedon of Isolde fine sand, in an area of Isolde-Toulon complex, 2,400 feet north and 800 feet east of the southwest corner of sec. 19, R. 24 E., T. 24 N.

A1—0 to 6 inches; light brownish gray (10YR 6/2) fine sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; moderately alkaline; clear smooth boundary.
C1—6 to 60 inches; light brownish gray (10YR 6/2) fine sand, dark grayish brown (10YR 4/2) moist;

massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; moderately alkaline.

The soil profile is more than 60 inches deep. Reaction throughout the profile is neutral to moderately alkaline. The control section (between depths of 10 inches and 40 inches) is fine sand. It is 0 to 5 percent clay.

Jorge Series

The Jorge series consists of very deep, well drained soils on uplands. These soils formed in residuum and colluvium derived mainly from andesite. Slopes are 15 to 50 percent.

Typical pedon of Jorge very stony sandy loam, in an area of Jorge-Boomtown-Fugawee association, 1,400 feet east and 1,150 feet north of the southwest corner of sec. 34, T. 19 N., R. 18 E.

O1—1 inch to 0; fir litter duff.

A11—0 to 3 inches; dark brown (10YR 4/3) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine interstitial and tubular pores; 15 percent pebbles, 10 percent cobbles, 15 percent stones; slightly acid; clear smooth boundary.

A12—3 to 9 inches; dark brown (10YR 4/3) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine through coarse roots; common fine interstitial and tubular pores; 15 percent pebbles, 20 percent cobbles; slightly acid; clear smooth boundary.

B21t—9 to 24 inches; yellowish brown (10YR 5/4) very stony loam, dark yellowish brown (10YR 3/5) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine through coarse roots; few fine tubular pores; few thin clay films bridging sand grains and pores; 15 percent pebbles, 20 percent cobbles, 15 percent stones; medium acid; clear wavy boundary.

B22t—24 to 52 inches; light yellowish brown (10YR 6/4) extremely gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; very few very fine and fine roots; few fine tubular pores; few thin clay films bridging sand grains and pores; 50 percent pebbles, 15 percent cobbles; medium acid; clear smooth boundary.

C1—52 to 65 inches; very pale brown (10YR 7/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; many very fine and fine tubular pores; 50 percent pebbles, 10 percent cobbles; medium acid.

The solum ranges from 40 to 65 inches in thickness. The depth to bedrock ranges from 60 to 80 inches. The A horizon is less than 10 inches thick. Reaction throughout the profile is slightly acid to medium acid. The B2t horizon is loam or clay loam. It is 20 to 35 percent clay and is 35 to 65 percent rock fragments.

Jowec Series

The Jowec series consists of very deep, well drained soils on low lake terraces. These soils formed in alluvium derived from mixed rock. Slopes are 0 to 2 percent.

Typical pedon of Jowec silty clay loam, 800 feet east and 800 feet north of the southwest corner of sec. 9, T. 21 N., R. 18 E.

A1—0 to 2 inches; light brownish gray (10YR 6/2) silty clay loam, brown (10YR 4/3) moist; weak thick platy structure; slightly hard, friable, sticky and plastic; very few roots; many fine and medium vesicular pores; slightly acid; abrupt smooth boundary.

B21t—2 to 9 inches; brown (10YR 5/3) clay, brown (10YR 4/3) moist; moderate medium prismatic structure; very hard, firm, sticky and plastic; many very fine and common fine roots; common very fine and fine tubular pores; common moderately thick clay films on ped faces and in pores; slightly acid; clear smooth boundary.

B22t—9 to 20 inches; light yellowish brown (10YR 6/4) clay, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure; very hard, very firm, sticky and plastic; few fine roots; common fine tubular pores; common moderately thick clay films on ped faces and in pores; neutral; clear smooth boundary.

C1—20 to 38 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; massive; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; neutral; clear smooth boundary.

IIA1b—38 to 54 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; massive; very hard, firm, sticky and slightly plastic; very few roots; very few pores; 15 percent strongly silica-cemented durinodes; effervescent with lime in seams; strongly alkaline; clear smooth boundary.

IIC2—54 to 59 inches; light yellowish brown (10YR 6/4) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few roots; few pores; effervescent; strongly alkaline; abrupt smooth boundary.

IIIAb—59 to 69 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak fine angular blocky structure; very hard, firm, sticky and slightly plastic;

violently effervescent; strongly alkaline; abrupt smooth boundary.

IIIC3—69 to 72 inches; pale brown (10YR 6/3) loamy sand, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, slightly sticky and nonplastic; violently effervescent; strongly alkaline.

The thickness of the solum and the depth to free carbonates range from 15 to 25 inches. Reaction ranges from slightly acid to strongly alkaline throughout the profile. The Bt horizon is dominantly clay, but may include layers of clay loam and silty clay. It is 40 to 50 percent clay.

Jowec Variant

The Jowec Variant consists of very deep, well drained soils on convex alluvial fans and terraces. These soils formed in alluvium derived mainly from granodiorite. Slopes are 4 to 15 percent.

Typical pedon of Jowec Variant sandy loam, 4 to 8 percent slopes, 1,500 feet west and 1,000 feet north of the southeast corner of sec. 24, T. 21 N., R. 18 E.

Ap1—0 to 1 inch; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; single grained; loose, nonsticky and nonplastic; many very fine interstitial pores; medium acid; abrupt smooth boundary.

Ap2—1 inch to 6 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; slightly acid; clear wavy boundary.

A&B—6 to 10 inches; light brownish gray (10YR 6/2) loamy sand, dark brown (10YR 3/3) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine to medium roots; many very fine interstitial pores; few thin clay films bridging and coating sand grains; slightly acid; abrupt wavy boundary.

B2t—10 to 20 inches; light brown (7.5YR 6/4) clay, reddish brown (5YR 4/4) moist; strong coarse columnar structure; very hard, firm, very sticky and very plastic; few very fine roots between columns; few fine tubular pores; many thin and few moderately thick clay films coating and bridging sand grains and in pores; slightly acid; abrupt wavy boundary.

B31t—20 to 33 inches; pale brown (10YR 6/3) sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; extremely hard, firm, sticky and plastic; many very fine interstitial and common fine tubular pores; many thin clay films bridging and coating sand grains; mildly alkaline; clear wavy boundary.

B32t—33 to 55 inches; light yellowish brown (10YR 6/4) sandy loam, brown (10YR 4/3) moist; massive; very hard, friable, slightly sticky and plastic; many very fine and common fine tubular pores; many thin clay films coating and bridging sand grains; moderately alkaline; abrupt wavy boundary.

IIB33t—55 to 66 inches; light yellowish brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) moist; strong fine subangular blocky structure; very hard, firm, sticky and plastic; few very fine tubular pores; many thin and few moderately thick clay films on ped faces; moderately alkaline.

The solum ranges from 40 to more than 60 inches in thickness. Reaction ranges from medium acid to moderately alkaline throughout the profile. The Bt horizon is clay, sandy clay, clay loam, sandy clay loam, sandy loam, or loam. The upper 20 inches of the argillic horizon is 35 to 45 percent clay.

Jubilee Series

The Jubilee series consists of very deep, poorly drained soils on alluvial fans and flood plains. These soils formed in alluvium derived mainly from granitic rocks. The slopes are 0 to 2 percent.

Typical pedon of Jubilee sandy loam, 2,000 feet west and 2,600 feet north of the southeast corner of sec. 22, T. 16 N., R. 19 E.

A1p—0 to 10 inches; dark gray (10YR 4/1) sandy loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

A12—10 to 22 inches; dark gray (10YR 4/1) coarse sandy loam, black (10YR 2/1) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; neutral; gradual wavy boundary.

C1—22 to 28 inches; light brownish gray (10YR 6/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; many pockets of black (10YR 2/1) moist; few medium distinct dark yellowish brown (10YR 4/4) mottles; massive; loose, nonsticky and nonplastic; neutral; gradual wavy boundary.

C2—28 to 60 inches; dark grayish brown (10YR 4/2) moist, with pockets of black (10YR 2/1) moist, stratified loamy coarse sand, loamy sand, sandy loam, and fine sandy loam that is highly micaceous; few medium distinct dark yellowish brown (10YR 4/4) mottles; massive; loose, nonsticky and nonplastic; neutral.

The soil profile is more than 60 inches in thickness. The mollic epipedon is 12 to 23 inches thick. Reaction throughout the profile ranges from slightly acid to mildly alkaline. Texture in the control section (between depths of 10 inches and 40 inches) averages sandy loam or coarse sandy loam. The control section is 5 to 18

percent clay. Faint or prominent mottles are in the lower part of the mollic epipedon.

Jubilee Variant

The Jubilee Variant consists of very deep, poorly drained soils on alluvial fans and flood plains. These soils formed in alluvium derived mainly from granitic rocks. The slopes are 0 to 2 percent.

Typical pedon of Jubilee Variant loam, slightly saline, 600 feet east and 1,400 feet north of the southwest corner of sec. 25, T. 16 N., R. 19 E.

A1p—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; friable, sticky and slightly plastic; many fine and very fine roots; many very fine pores; strongly alkaline; clear smooth boundary.

A12—7 to 14 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine and very fine roots and common medium and coarse roots; few fine and very fine and common medium and coarse tubular pores; strongly alkaline; gradual smooth boundary.

AC—14 to 20 inches; pale brown (10YR 6/3) sandy loam, very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) moist; light brownish gray (10YR 6/2) lime mottles; massive; friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; moderately alkaline; gradual smooth boundary.

C1—20 to 33 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (2.5Y 4/2) moist and olive brown (2.5Y 4/4) moist; light brownish gray (2.5Y 6/2) lime mottles; massive; friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; moderately alkaline; clear smooth boundary.

C2—33 to 51 inches; olive brown (2.5Y 4/4) moist stratified loamy sand, sandy loam, and loamy coarse sand; common large prominent bluish gray (5B 5/1) mottles; single grained; loose, nonsticky and nonplastic; moderately alkaline; clear smooth boundary.

C3—51 to 60 inches; 50 percent yellowish brown (10YR 5/6) moist and 50 percent bluish gray (5B 5/1) moist stratified loamy sand and loamy fine sand; single grained; loose, nonsticky and nonplastic; moderately alkaline.

The solum ranges from 12 to 23 inches in thickness. Reaction ranges from moderately alkaline to strongly alkaline throughout the profile. The control section (between a depth of 10 inches and 40 inches) averages sandy loam or coarse sandy loam. It is 8 to 15 percent clay. Mottles may be present in the lower part of the mollic epipedon.

Jumbo Series

The Jumbo series consists of deep, well drained soils on uplands. These soils formed in colluvium and residuum mainly of volcanic rock. Slopes are 30 to 50 percent.

Typical pedon of Jumbo very stony loam, in an area of Fraval-Booford-Jumbo association, 50 feet east and 1,000 feet south of the northwest corner of sec. 27, T. 18 N., R. 19 E.

A11—0 to 5 inches; dark grayish brown (10YR 4/2) very stony loam, very dark grayish brown (10YR 3/2) moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; many fine and very fine interstitial pores, and common fine tubular pores; 20 percent pebbles, 5 percent cobbles, 5 percent stones; slightly acid; clear smooth boundary.

A12—5 to 11 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; soft, very friable, nonsticky and slightly plastic; many fine and very fine and common coarse and medium roots; many very fine and fine interstitial and tubular pores; 20 percent pebbles, 5 percent cobbles; slightly acid; clear wavy boundary.

A13—11 to 21 inches; grayish brown (10YR 5/2) cobbly loam, dark brown (7.5YR 3/2) moist; moderate medium angular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine and common medium coarse roots; many fine and very fine interstitial and tubular pores; 5 percent pebbles, 15 percent cobbles, 5 percent stones; slightly acid; clear smooth boundary.

B1t—21 to 34 inches; brown (10YR 4/3) very cobbly loam, dark brown (7.5YR 4/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; common fine to coarse roots; common fine and medium tubular pores; few thin clay films bridging sand grains; 5 percent pebbles, 40 percent cobbles, 1 percent stones; slightly acid; gradual wavy boundary.

B2t—34 to 54 inches; brown (10YR 4/3) very cobbly loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; common fine to coarse roots; common fine and medium tubular pores; common thin clay films bridging sand grains and in pores; 5 percent pebbles, 50 percent cobbles, 1 percent stones; slightly acid; gradual irregular boundary.

Cr—54 to 70 inches; highly weathered volcanic bedrock.

The solum ranges from 40 to 60 inches in thickness. The mollic epipedon is 20 to 30 inches thick. Reaction ranges from medium acid to neutral throughout the profile.

The Bt horizon is loam or clay loam. It is 20 to 30 percent clay and is 40 to 60 percent rock fragments.

Kayo Series

The Kayo series consists of very deep, somewhat excessively drained soils on alluvial fans. These soils formed in alluvium derived from mixed rock. Slopes are 2 to 30 percent.

Typical pedon of Kayo stony sandy loam, 2 to 4 percent slopes, 300 feet west and 300 feet south of the northeast corner of sec. 10, T. 22 N., R. 21 E.

A11—0 to 3 inches; brown (10YR 5/3) stony loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine and fine interstitial pores; 1 percent stones, 45 percent pebbles; neutral; clear smooth boundary.

A12—3 to 11 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots and common fine and medium roots; many very fine and fine interstitial pores; 40 percent pebbles; neutral; abrupt wavy boundary.

B2t—11 to 22 inches; brown (10YR 5/3) very gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; few very fine and fine tubular pores; many thin and few moderately thick clay films bridging and coating mineral grains; 40 percent pebbles; neutral; clear wavy boundary.

C1—22 to 37 inches; brown (10YR 5/3) very gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; few very fine and fine tubular pores; 55 percent pebbles; neutral; abrupt smooth boundary.

IIC2ca—37 to 60 inches; grayish brown (10YR 5/2) very gravelly light sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; very few pores; 60 percent gravel; strongly effervescent with lime coating the pebbles; moderately alkaline.

The solum ranges from 12 to 24 inches in thickness. Reaction ranges from slightly acid to neutral in the A and B horizons and from neutral to moderately alkaline in the C horizon.

The Bt horizon is coarse sandy loam, sandy loam, or loam. It is 13 to 18 percent clay and is 35 to 50 percent rock fragments.

Kleinbush Series

The Kleinbush series consists of very deep, well drained soils that formed in alluvium from basalt. These soils are on alluvial fans. Slopes are 0 to 8 percent.

Typical pedon of Kleinbush very cobbly loamy sand, in an area of Sutcliff-Kleinbush-Washoe association, 1,000 feet north and 200 feet west of the southeast corner of sec. 7, T. 21 N., R. 25 E.

A1—0 to 4 inches; light gray (10YR 7/2) very cobbly loamy sand, grayish brown (10YR 5/2) moist; weak subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine tubular pores; 5 percent pebbles, 40 percent cobbles, 1 percent stones; moderately alkaline; abrupt smooth boundary.

A2—4 to 5 inches; light gray (10YR 7/1) very fine sandy loam, gray (10YR 5/1) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and common medium vesicular pores; moderately alkaline; abrupt smooth boundary.

B21t—5 to 13 inches; light brown (7.5YR 6/4) clay, brown (7.5YR 5/4) moist; strong medium and coarse prismatic structure; very hard, friable, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; common moderately thick clay films on ped faces and in pores; strongly alkaline; clear smooth boundary.

B3tca—13 to 19 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; strong medium angular blocky structure; hard, friable, sticky and plastic; few thin clay films on ped faces and in pores; strongly effervescent; strongly alkaline; clear smooth boundary.

B22tcab—19 to 30 inches; reddish yellow (7.5YR 6/6) clay loam, strong brown (7.5YR 5/6) moist; strong and medium prismatic structure; hard, friable, sticky and plastic; common fine and medium dead roots; common very fine and fine tubular pores; strongly effervescent; moderately alkaline; gradual smooth boundary.

B23tcab—30 to 38 inches; reddish brown (7.5YR 6/6) clay, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine dead roots; few very fine and fine tubular pores; few thin clay films in pores; violently effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—38 to 60 inches; pinkish gray (7.5YR 7/2) cobbly sandy clay loam, light brown (7.5YR 6/4) moist; massive; slightly hard, very friable, slightly sticky and

slightly plastic; 5 percent pebbles; 10 percent cobbles; many medium irregularly-shaped disseminated lime filaments; violently effervescent; moderately alkaline.

Thickness of the solum ranges from 20 to 40 inches. Reaction throughout the profile ranges from mildly alkaline to very strongly alkaline.

The Bt horizon is clay or clay loam. It is 35 to 60 percent clay.

Koontz Series

The Koontz series consists of shallow, well drained soils on uplands. These soils formed in residuum of altered igneous and metavolcanic rock. Slopes are 8 to 50 percent.

Typical pedon of Koontz gravelly loam, 8 to 15 percent slopes, about 1 mile east of New Washoe City, about 2,400 feet west and 1,250 feet north of the southeast corner of sec. 20, T. 17 N., R. 20 E.

A11—0 to 1 inch; brown (10YR 5/3) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; many very fine and fine vesicular and interstitial pores; 35 percent pebbles; neutral; abrupt smooth boundary.

A12—1 inch to 5 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores and common medium tubular pores; 20 percent pebbles; neutral; clear smooth boundary.

B21t—5 to 10 inches; brown (10YR 5/3) very gravelly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; common medium roots; common medium and coarse pores; common moderately thick clay films on ped faces and in pores; 35 percent pebbles, 10 percent cobbles; neutral; clear smooth boundary.

B22t—10 to 14 inches; yellowish brown (10YR 5/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate fine prismatic structure; very hard, friable, sticky and plastic; common medium and coarse roots; common medium and coarse pores; many moderately thick clay films on ped faces and in pores; 35 percent pebbles, 5 percent cobbles; neutral; clear wavy boundary.

B23t—14 to 18 inches; light olive brown (2.5Y 5/4) gravelly clay loam, light olive brown (2.5Y 5/4) moist; weak fine angular blocky structure; very hard, firm, sticky and plastic; common fine and medium roots; many moderately thick clay films on ped faces; 25 percent angular pebbles; neutral; clear wavy boundary.

Cr—18 to 30 inches; weathered metamorphosed tuffaceous sediments.

The solum thickness and the depth to paralithic contact are 14 to 20 inches. The mollic epipedon is 7 to 14 inches thick. Reaction throughout the profile is neutral to mildly alkaline.

The B2t horizon is clay loam or loam. It is 25 to 35 percent clay and is 40 to 45 percent rock fragments.

Lemm Series

The Lemm series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived mainly from granodiorite. Slopes are 4 to 30 percent.

Typical pedon of Lemm very gravelly coarse sandy loam, 4 to 8 percent slopes, 1,000 feet north of the southeast corner of sec. 35, T. 21 N., R. 18 E.

About 15 percent of the surface is covered with gravel.

A11—0 to 3 inches; grayish brown (10YR 5/2) very gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 40 percent pebbles; neutral; clear wavy boundary.

A12—3 to 10 inches; grayish brown (10YR 5/2) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores; 30 percent pebbles; neutral; clear wavy boundary.

A13—10 to 19 inches; grayish brown (10YR 5/2) very gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots and few medium and coarse roots; many very fine interstitial pores; 40 percent pebbles; neutral; clear wavy boundary.

B21t—19 to 29 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine to medium roots; many very fine interstitial pores; common thin clay films coating and bridging sand grains; 40 percent pebbles; neutral; clear wavy boundary.

B22t—29 to 40 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine interstitial pores; common thin clay films coating and bridging sand grains; 35 percent pebbles; neutral; clear wavy boundary.

C1—40 to 60 inches; very pale brown (10YR 7/3) very gravelly loamy coarse sand, dark brown (10YR 3/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 35 percent pebbles; neutral.

The solum ranges from 30 to 48 inches in thickness. Reaction throughout the profile is medium acid to neutral.

The Bt horizon is coarse sandy loam, sandy loam, or fine sandy loam and is 35 to 50 percent pebbles. The clay content ranges from 10 to 18 percent.

Leviathan Series

The Leviathan series consists of very deep, well drained soils on terraces and their escarpments and on alluvial fans. These soils formed in alluvium derived from mixed rock. The slopes are 0 to 50 percent.

Typical pedon of Leviathan stony sandy loam, 2 to 8 percent slopes, 750 feet west and 2,600 feet south of the northeast corner of sec. 15, T. 19 N., R. 18 E.

A1—0 to 9 inches; grayish brown (10YR 5/2) stony sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to coarse roots; many very fine and fine tubular pores; 15 percent pebbles, 10 percent cobbles, 2 percent stones; neutral; clear wavy boundary.

B1t—9 to 14 inches; brown (10YR 5/3) very cobbly sandy clay loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to moderate medium angular blocky; very hard, firm, sticky and plastic; common very fine to coarse roots; common very fine and fine tubular pores; common moderately thick clay films on ped faces and in pores; 20 percent pebbles, 25 percent cobbles, 5 percent stones; neutral; clear wavy boundary.

B21t—14 to 28 inches; brown (7.5YR 5/4) very gravelly heavy sandy clay loam, brown (7.5YR 4/4) moist; moderate coarse and medium prismatic structure; very hard, firm, sticky and plastic; few fine and medium roots; few very fine and fine tubular pores; common moderately thick clay films on ped faces and in pores; 25 percent pebbles, 10 percent cobbles, 5 percent stones; neutral; gradual wavy boundary.

B22t—28 to 44 inches; brown (7.5YR 5/4) very gravelly heavy sandy clay loam, brown (7.5YR 4/4) moist; weak coarse prismatic structure; very hard, firm, sticky and plastic; few fine and medium roots; few fine and very fine tubular pores; common moderately thick clay films on ped faces and in pores; some silica coatings on bottom sides of cobbles; 45 percent pebbles, 15 percent cobbles; neutral; clear wavy boundary.

B23t—44 to 55 inches; brown (7.5YR 5/4) very gravelly sandy clay loam, brown (7.5YR 5/4) moist; massive; very hard, friable, sticky and plastic; few fine and medium roots; few fine and very fine pores; common moderately thick clay films in pores and bridging sand grains; some silica coatings on bottom sides of cobbles; 45 percent pebbles, 10 percent cobbles; neutral; gradual wavy boundary.

B24t—55 to 65 inches; brown (7.5YR 5/4) very gravelly sandy clay loam, brown (7.5YR 5/4) moist; massive; very hard, friable, sticky and slightly plastic; few fine and medium roots; few fine and very fine tubular pores; common moderately thick clay films in pores and bridging sand grains; some silica coatings on the bottom sides of cobbles; 45 percent pebbles, 10 percent cobbles, and 5 percent stones that are highly weathered; neutral.

The solum is more than 60 inches in thickness. Reaction throughout the profile ranges from slightly acid to neutral.

The Bt horizon is sandy clay loam. It is 27 to 35 percent clay. In some pedons it has subhorizons of sandy clay that are 40 to 60 percent rock fragments.

Linhart Series

The Linhart series consists of very deep, somewhat excessively drained soils on alluvial fans and terraces. These soils formed in alluvium derived mainly from granitic rocks. The slopes are 4 to 30 percent.

Typical pedon of Linhart stony coarse sand, 4 to 8 percent slopes, 2,400 feet west and 600 feet north of the southeast corner of sec. 4, T. 23 N., R. 20 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) stony loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine to medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and fine interstitial pores; few fine and medium tubular pores; 25 percent fine pebbles, 2 percent stones; slightly acid; clear smooth boundary.

A12—4 to 14 inches; dark grayish brown (10YR 4/2) very gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine to medium roots; many very fine and fine interstitial pores and common fine, medium, and coarse tubular pores; 35 percent fine pebbles, 2 percent cobbles; neutral; gradual wavy boundary.

C1—14 to 27 inches; grayish brown (10YR 5/2) very gravelly coarse sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine to medium and few coarse roots; many very fine and fine interstitial pores; common fine, medium, and

coarse tubular pores; 45 percent fine pebbles; neutral; abrupt wavy boundary.

IIC2—27 to 41 inches; light brownish gray (10YR 6/2) very gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine to coarse roots; common very fine to medium tubular pores; 60 percent fine pebbles; neutral; abrupt smooth boundary.

IIIA1b—41 to 48 inches; grayish brown (10YR 5/2) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores, common very fine and fine tubular pores; 30 percent fine pebbles; neutral; clear smooth boundary.

IIIC3—48 to 60 inches; light brownish gray (10YR 6/2) very gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; many very fine and fine interstitial pores, common very fine and fine tubular pores; 40 percent fine pebbles; neutral.

The soil profile is deeper than 60 inches. Reaction throughout the profile is neutral or slightly acid. The control section (between depths of 10 inches and 40 inches) is coarse sand, loamy coarse sand, loamy sand, or sand. It is 2 to 8 percent clay and is 35 to 70 percent pebbles.

Luppino Series

The Luppino series consists of shallow, well drained soils on dissected pediments. These soils formed in alluvium derived mainly from granodiorite. Slopes are 4 to 15 percent.

Typical pedon of Luppino gravelly sandy loam, 4 to 8 percent slopes, 1,200 feet west and 1,300 feet south of the northeast corner of sec. 7, T. 20 N., R. 20 E.

About 65 percent of the surface is covered with gravel.

A11—0 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 30 percent gravel; slightly acid; clear smooth boundary.

A12—6 to 8 inches; yellowish brown (10YR 5/4) sandy loam, dark brown (10YR 3/3) moist; massive; soft, friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial and tubular pores; neutral; clear smooth boundary.

B2t—8 to 14 inches; yellowish brown (10YR 5/4) sandy clay loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many very fine interstitial and tubular pores; many thin clay films bridging sand grains; neutral; abrupt wavy boundary.

Cr—14 to 23 inches; weathered granitic saprolite (decomposed granodiorite).

R—23 inches; unweathered granodiorite bedrock.

Solum thickness and depth to paralithic contact range from 12 to 20 inches. The depth to hard bedrock ranges from 20 to 30 inches. Reaction throughout the profile ranges from medium acid to neutral. The Bt horizon is sandy clay loam or sandy loam. It is 18 to 30 percent clay.

Macareeno Series

The Macareeno series consists of very deep, poorly drained soils on hillsides. These soils formed in residuum and colluvium from mixed, but dominantly volcanic, residuum. Slopes are 8 to 15 percent.

Typical pedon of Macareeno loam, in an area of Macareeno-Blackwell-Carioca association, 1,800 feet west and 1,000 feet north of the southeast corner of sec. 21, T. 18 N., R. 18 E.

O1—1 inch to 0; loose, partially decomposed organic litter.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; strong fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; many very fine and fine tubular and interstitial pores; 10 percent pebbles; neutral; clear smooth boundary.

A12—2 to 8 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine through coarse roots; many fine and medium tubular pores; 10 percent pebbles; slightly acid; clear smooth boundary.

B1t—8 to 11 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and many medium and coarse roots; common fine and medium tubular pores; few fine clay films on ped faces and in pores; 15 percent pebbles, 5 percent cobbles; slightly acid; gradual smooth boundary.

B21t—11 to 19 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark yellowish brown (10YR 3/4) moist; weak medium angular blocky structure; hard, friable, sticky and plastic; common coarse and few fine and medium roots; few fine and medium pores; common thin and moderately thick clay films on ped faces and in pores; 20 percent pebbles, 5 percent cobbles; medium acid; gradual smooth boundary.

B22t—19 to 27 inches; pale brown (10YR 6/3) gravelly clay loam, brown (10YR 4/3) moist; massive; very

hard, friable, sticky and plastic; common coarse and few fine and medium roots; few fine and medium tubular pores; 25 percent pebbles, 5 percent cobbles; medium acid; clear smooth boundary.

IIB23t—27 to 41 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 4/3) moist; massive; very hard, friable, sticky and plastic; few very fine through medium dead roots; few fine and medium tubular pores; 30 percent pebbles, 5 percent cobbles; slightly acid; abrupt smooth boundary.

IIC1—41 to 54 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 4/3) moist; massive; very hard, friable, sticky and plastic; very few roots; few very fine and fine tubular pores; 20 percent pebbles, 15 percent cobbles; 5 percent stones; slightly acid.

Solum thickness is greater than 40 inches. Reaction throughout the profile ranges from medium acid to neutral. The B2t horizon is clay loam. It is 27 to 35 percent clay and is 15 to 35 percent rock fragments.

Manogue Series

The Manogue series consists of deep, well drained soils on uplands. These soils formed in alluvium and colluvium derived from mixed rock sources. Slopes are 2 to 30 percent.

Typical pedon of Manogue cobbly clay, 8 to 15 percent slopes, 1,320 feet west and 1,320 feet north of the southeast corner of sec. 17, T. 20 N., R. 20 E.

A1—0 to 3 inches; dark brown (10YR 3/3) cobbly clay, dark brown (10YR 3/3) moist; moderate very fine granular structure; soft, very friable, very sticky and very plastic; very few roots; many very fine interstitial pores; 25 percent pebbles, 5 percent cobbles; neutral; abrupt smooth boundary.

B21—3 to 15 inches; brown (10YR 4/3) clay, dark yellowish brown (10YR 4/4) moist; strong medium and coarse prismatic structure; very hard, very firm, very sticky and very plastic; very few roots; few very fine tubular pores; common slickensides; slightly effervescent; moderately alkaline; abrupt smooth boundary.

B22—15 to 30 inches; brown (10YR 4/3) clay, dark yellowish brown (10YR 4/4) moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; very few roots; few fine tubular pores; 5 percent pebbles; common slickensides; strongly effervescent; moderately alkaline; clear smooth boundary.

B23—30 to 41 inches; brown (10YR 4/3) clay, dark yellowish brown (10YR 4/4) moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; very few roots; few fine tubular pores; 5 percent pebbles; common slickensides; strongly effervescent; moderately alkaline; clear smooth boundary.

B3—41 to 57 inches; brown (10YR 4/3) clay, dark yellowish brown (10YR 4/4) moist; weak very coarse prismatic structure; very hard, very firm, very sticky and very plastic; very few roots; very few fine tubular pores; 5 percent pebbles, common slickensides; strongly effervescent; moderately alkaline; abrupt wavy boundary.

C1ca—57 to 63 inches; pale brown (10YR 6/3) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak medium angular blocky structure; hard, firm, sticky and plastic; no roots; very few fine tubular pores; 15 percent pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

C2r—63 to 65 inches; highly weathered andesite.

The depth to weathered bedrock is more than 40 inches. Reaction ranges from slightly acid to moderately alkaline throughout the profile. The control section (between depths of 10 inches and 40 inches) is clay or silty clay. It has an average clay content of 40 to 55 percent. The soil cracks open at the surface during summer and early fall.

Marla Series

The Marla series consists of very deep, poorly drained soils on alluvial fans. These soils formed in alluvium derived mainly from granitic rocks. Slopes are 0 to 8 percent.

Typical pedon of Marla loamy sand, 4 to 8 percent slopes, 1,900 feet west and 1,700 feet south of the northeast corner of sec. 5, T. 16 N., R. 19 E.

A11—0 to 6 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; 10 percent fine pebbles; slightly acid; clear smooth boundary.

A12—6 to 18 inches; grayish brown (10YR 5/2) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; many very fine and fine interstitial pores; 15 percent pebbles; slightly acid; clear smooth boundary.

C1—18 to 28 inches; light yellowish brown (10YR 6/4) loamy sand, dark yellowish brown (10YR 4/4) moist; few medium prominent dark brown (7.5YR 3/2) mottles; massive; soft, very friable, nonsticky and nonplastic; many fine and medium roots; many fine tubular pores; 10 percent fine pebbles; slightly acid; clear smooth boundary.

C2—28 to 34 inches; light yellowish brown (10YR 6/4) loamy sand, yellowish brown (10YR 5/6) moist;

common medium distinct reddish yellow (7.5YR 6/6) mottles; massive; soft, friable, slightly sticky and nonplastic; few fine medium roots; few fine tubular pores; 10 percent fine pebbles; slightly acid; clear smooth boundary.

C3—34 to 44 inches; light yellowish brown (10YR 6/4) loamy sand, yellowish brown (10YR 5/4) moist; common medium prominent strong brown (7.5YR 5/6) mottles; massive; soft, friable, slightly sticky and nonplastic; few medium roots; very few pores; 10 percent fine pebbles; slightly acid; gradual wavy boundary.

C4g—44 to 60 inches; very pale brown (10YR 7/4) loamy sand and thin strata of loam, light yellowish brown (10YR 6/4) moist; loam is light gray (5YR 7/1); massive; soft, very friable, nonsticky and nonplastic; very few roots; very few pores; slightly acid.

Depth of the profile is more than 60 inches. The umbric epipedon is 10 to 20 inches thick. Reaction throughout the profile is strongly acid to neutral. Texture in the control section (between depths of 10 inches and 40 inches) averages loamy coarse sand or loamy sand that is 2 to 8 percent clay. The control section contains 0 to 15 percent fine pebbles.

McQuarrie Series

The McQuarrie series consists of shallow, well drained soils on mountain ridges and slopes. These soils formed in residuum and colluvium mainly derived from basalt. Slopes are 15 to 50 percent.

Typical pedon of McQuarrie very stony sandy loam, in an area of McQuarrie-Tristan-Arzo association, 500 feet west and 1,100 feet north of the southeast corner of sec. 34, T. 22 N., R. 22 E.

A1—0 to 1 inch; brown (10YR 4/3) very stony sandy loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; common fine interstitial pores; 25 percent pebbles, 5 percent cobbles; mildly alkaline; abrupt smooth boundary.

B21t—1 inch to 8 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; many fine and very fine and few coarse roots; common fine tubular and few fine interstitial pores; common thin clay films; 10 percent pebbles, 3 percent cobbles; mildly alkaline; clear smooth boundary.

B22t—8 to 15 inches; dark yellowish brown (10YR 4/4) gravelly clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine and many coarse and medium roots; common medium and fine tubular pores; many moderately thick clay films; 20 percent pebbles, 5 percent cobbles; mildly alkaline; clear wavy boundary.

B3ca—15 to 18 inches; pale brown (10YR 6/3) very cobbly clay loam, brown (10YR 5/3) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common fine tubular pores; 10 percent pebbles, 20 percent cobbles, 5 percent stones; moderately effervescent; moderately alkaline; abrupt wavy boundary.

R—18 inches; hard bedrock.

Thickness of the solum and depth to bedrock range from 10 to 20 inches. The mollic epipedon is 7 to 20 inches thick and includes the upper part of the B2t horizon. Reaction is neutral to moderately alkaline in the upper part and mildly alkaline or moderately alkaline in the lower part. The control section is loam or clay loam and is 20 to 35 percent clay.

Meiss Series

The Meiss series consists of shallow, excessively drained soils on uplands. These soils formed in residuum of andesitic breccia. Slopes are 15 to 50 percent.

Typical pedon of Meiss very cobbly sandy loam, in an area of Meiss-Sibelia-Rock outcrop association, 400 feet west and 500 feet south of the northeast corner of sec. 22, T. 17 N., R. 18 E.

O1—1 inch to 0; pine litter duff.

A11—0 to 7 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine through medium roots; many very fine and fine interstitial pores; 20 percent pebbles, 20 percent cobbles; medium acid; clear smooth boundary.

A12—7 to 20 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine through medium roots; many very fine and fine interstitial pores; 20 percent pebbles, 10 percent cobbles; medium acid; abrupt wavy boundary.

R—20 inches; hard, reddish pyroclastic andesitic rock.

Depth to bedrock ranges from 10 to 20 inches. Reaction throughout the profile is slightly acid to medium acid. The apparent field texture is loam or sandy loam. The profile is 5 to 15 percent clay and averages 10 to 30 percent rock fragments.

Mellor Series

The Mellor series consists of very deep, moderately well drained soils on alluvial fans and terraces. These soils formed in alluvium from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Mellor silt loam, 1,850 feet east and 1,050 feet south of the northwest corner of sec. 32, T. 23 N., R. 21 E.

A11—0 to 6 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate thick platy structure parting to moderate thin platy; slightly hard, very friable, slightly sticky and plastic; common very fine and fine roots; many very fine interstitial and common very fine vesicular pores; slightly effervescent; moderately alkaline; clear smooth boundary.

A12—6 to 11 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium platy structure parting to moderate medium subangular blocky; slightly hard, very friable, sticky and plastic; common very fine and fine roots; common very fine interstitial and vesicular pores; slightly effervescent; strongly alkaline; abrupt smooth boundary.

B21t—11 to 18 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; few very fine, fine, and medium roots; common very fine tubular and few fine interstitial pores; few moderately thick clay films bridging sand grains and few thin films on ped faces; strongly effervescent; strongly alkaline; clear smooth boundary.

B22t—18 to 26 inches; light yellowish brown (10YR 6/4) silty clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine angular blocky; hard, friable, very sticky and plastic; few very fine and fine and common medium roots; common very fine tubular and few fine interstitial pores; few moderately thick clay films bridging sand grains and few thin films on ped faces; strongly effervescent; strongly alkaline; clear smooth boundary.

C1ca—26 to 49 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; massive; hard, very friable, very sticky and plastic; few very fine and fine roots; few very fine tubular pores; few pressure faces along diagonal cracks; few fine filaments of lime; violently effervescent; very strongly alkaline; clear smooth boundary.

C2ca—49 to 60 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; common fine distinct white (10YR 8/1) mottles; massive; hard, very friable, very sticky and plastic; few very fine roots; few very fine tubular pores; lime occurs as common fine soft masses in seams and as filaments; violently effervescent; moderately alkaline.

The solum ranges from 15 to 26 inches in thickness. Reaction throughout the profile is moderately alkaline to very strongly alkaline. Texture of the B2t horizon is silty clay loam. The B2t horizon is 27 to 35 percent clay and less than 15 percent fine sand or coarser. The exchangeable bases are 15 to 30 percent sodium.

Mizel Series

The Mizel series consists of very shallow, well drained soils on uplands. These soils formed in residuum mainly of volcanic rocks. Slopes are 15 to 50 percent.

Typical pedon of Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes, 300 feet west and 300 feet south of the northeast corner of sec. 14, T. 20 N., R. 19 E.

About 80 percent of the surface is covered with gravel. About 1 percent of the surface is rhyolite rock outcrop.

A11—0 to 1 inch; very pale brown (10YR 7/3) very gravelly coarse sandy loam, brown (10YR 5/3) moist; massive; loose, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 80 percent pebbles; slightly acid; abrupt wavy boundary.

A12—1 inch to 3 inches; very pale brown (10YR 7/3) gravelly loam, dark brown (10YR 4/3) moist; weak thin platy structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine vesicular pores; 30 percent pebbles; medium acid; abrupt wavy boundary.

R—3 to 7 inches; white (10YR 8/2) rhyolite bedrock, fractured and cracked with reddish yellow (7.5YR 6/6) coatings on fragments and in cracks. Few roots in cracks.

Depth to hard bedrock is 3 to 10 inches. Reaction in the profile is medium acid or slightly acid. Texture is gravelly or very gravelly sandy loam, fine sandy loam, or loam and is 5 to 15 percent clay. The gravel content averages 40 to 60 percent.

Mosquet Series

The Mosquet series consists of very shallow and shallow, well drained soils on mountain ridges and slopes. These soils formed in residuum of basalt. Slopes are 4 to 30 percent.

Typical pedon of Mosquet very cobbly fine sandy loam, in an area of Thulepah-Mosquet association, and 1,600 feet east of the southwest corner of sec. 3, T. 24 N., R. 20 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) very cobbly fine sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very

fine and fine roots; many very fine and fine tubular and interstitial pores; 15 percent pebbles, 25 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

A12—4 to 5 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; strong medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; 20 percent pebbles, 25 percent cobbles; neutral; abrupt smooth boundary.

B21t—5 to 11 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; weak fine angular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; common moderately thick clay films on ped faces and in pores; 25 percent pebbles, 5 percent cobbles; slightly acid; clear wavy boundary.

B22t—11 to 14 inches; dark yellowish brown (10YR 4/4) gravelly clay, dark yellowish brown (10YR 3/4) moist; weak fine and medium angular blocky structure; very hard, firm, very sticky and very plastic; few very fine and fine roots; common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 20 percent pebbles; slightly acid; abrupt broken boundary.

R—14 inches; fractured basalt bedrock.

Thickness of the solum and depth to bedrock range from 6 to 14 inches in the shallow part and from 8 to 20 inches in the deepest part. The fractures and fissures containing B2t material range from 2 to 6 inches wide at the top to less than 1/4 inch wide within 20 inches of the surface. The mollic epipedon ranges from 6 to 14 inches in thickness and includes part or all of the argillic horizon. Reaction throughout the profile ranges from slightly acid to neutral. The argillic horizon is clay loam or clay. It is 35 to 50 percent clay and is 15 to 35 percent rock fragments.

Mottsville Series

The Mottsville series consists of very deep, excessively drained soils on alluvial fans. These soils formed in alluvium derived mainly from granodiorite. Slopes are 0 to 15 percent.

Typical pedon of Mottsville sand, 0 to 4 percent slopes, 700 feet east and 600 feet north of the southwest corner of sec. 32, T. 17 N., R. 20 E.

A1—0 to 10 inches; grayish brown (10YR 5/2) sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; 10 percent fine pebbles; neutral; gradual smooth boundary.

C1—10 to 29 inches; pale brown (10YR 6/3) stratified sand and loamy sand, brown (10YR 4/3) moist; weak medium subangular blocky structure that readily parts to single grained; soft, very friable, nonsticky and nonplastic; 10 percent fine pebbles; neutral; gradual smooth boundary.

C2—29 to 34 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; 10 percent fine pebbles; neutral; clear smooth boundary.

C3—34 to 60 inches; pale brown (10YR 6/3) stratified sand and loamy sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; 10 percent fine pebbles; neutral.

Depth of the profile is more than 60 inches. The mollic epipedon is 10 to 20 inches thick. Reaction throughout the profile is neutral to medium acid.

The control section is sand or loamy sand and is 3 to 10 percent clay. It is 0 to 15 percent rock fragments, mostly fine pebbles.

Northmore Series

The Northmore series consists of very deep, well drained soils on dissected alluvial fans. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 15 percent.

Typical pedon of Northmore sandy loam, 2 to 4 percent slopes, 1,000 feet east and 1,000 feet north of the southwest corner of sec. 10, T. 20 N., R. 19 E.

A11—0 to 1 inch; grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; 25 percent pebbles; slightly acid; abrupt wavy boundary.

A12—1 inch to 3 inches; brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine vesicular pores; slightly acid; abrupt wavy boundary.

A13—3 to 6 inches; grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist; weak very thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; slightly acid; clear smooth boundary.

A14—6 to 11 inches; grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine interstitial pores; slightly acid; clear smooth boundary.

B1—11 to 15 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 4/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; common thin clay films

bridging sand grains and in pores; slightly acid; clear smooth boundary.

B21t—15 to 19 inches; brown (7.5YR 5/4) sandy clay, dark brown (7.5YR 4/4) moist; moderate very fine subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many thin clay films on ped faces and in pores; neutral; clear smooth boundary.

B22t—19 to 30 inches; yellowish brown (10YR 5/4) sandy clay, brown (7.5YR 5/2) moist; moderate very fine subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many thin and few moderately thick clay films on ped faces and in pores; 15 to 20 percent durinodes; slightly acid; clear smooth boundary.

B3—30 to 45 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; moderate very fine subangular blocky structure; very hard, firm, sticky and plastic; few roots; few very fine tubular pores; neutral; clear smooth boundary.

C1—45 to 54 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 3/3) moist; weak very fine subangular blocky structure; hard, friable, sticky and slightly plastic; few roots; few very fine tubular pores; neutral; clear smooth boundary.

C2—54 to 60 inches; brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, friable, slightly sticky and nonplastic; neutral.

The solum ranges from 36 to 60 inches in thickness. Reaction ranges from slightly acid to neutral throughout the profile. The Bt horizon is sandy clay, sandy clay loam, or clay. It has an average clay content of 35 to 45 percent.

Nosrac Series

The Norsac series consists of very deep, well drained soils on mountain slopes. These soils formed in colluvium and residuum derived from andesite. Slopes are 30 to 50 percent.

Typical pedon of Nosrac stony clay loam, in an area of Cagle-Nosrac-Old Camp association, 100 feet north and 400 feet west of the southeast corner of sec. 16, T. 16 N., R. 20 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) stony loam, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; many fine interstitial pores; 10 percent pebbles, 10 percent stones; slightly acid; clear smooth boundary.

A12—2 to 14 inches; brown (10YR 5/3) very gravelly light clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine through coarse tubular pores; 45 percent pebbles; neutral; clear smooth boundary.

B21t—14 to 38 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 4/3) moist; strong medium subangular blocky structure; very hard, friable, sticky and plastic; common very fine and fine roots; common very fine through coarse tubular pores; 55 percent pebbles; neutral; clear smooth boundary.

B22t—38 to 60 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine roots; common very fine through coarse tubular pores; 45 percent pebbles; neutral; clear wavy boundary.

C—60 to 74 inches; light yellowish brown (10YR 6/4) very cobbly loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and medium roots; few very fine and fine tubular pores; 30 percent pebbles, 20 percent cobbles; neutral; abrupt wavy boundary.

R—74 inches; hard, fractured bedrock.

The solum is more than 50 inches thick. Depth to bedrock ranges from 60 to 80 inches. The mollic epipedon is 14 to 20 inches thick and includes the upper part of the B2t horizon. Reaction throughout the profile is slightly acid to neutral. The control section is loam or clay loam and is 25 to 35 percent clay. It is 35 to 60 percent rock fragments.

Notus Series

The Notus series consists of very deep soils on alluvial flood plains. Drainage has been altered. These soils formed in alluvium derived from mixed rock sources. Slopes are 2 to 14 percent.

Typical pedon of Notus stony loamy fine sand, 2,340 feet west and 2,640 feet south of the northeast corner of sec. 7, T. 19 N., R. 18 E.

A11—0 to 12 inches; light brownish gray (10YR 6/2) stony loamy fine sand, dark grayish brown (10YR 4/2) moist; moderate medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine to medium roots; 2 percent stones; neutral; abrupt wavy boundary.

C1—12 to 24 inches; light brownish gray (10YR 6/2) very gravelly and cobbly coarse sand, dark grayish brown (10YR 4/2) moist; common prominent reddish brown (5YR 5/4) and few fine prominent very dark gray (5Y 3/1) mottles; single grained; loose, nonsticky and nonplastic; common very fine to medium roots; many fine and medium interstitial

pores; 50 percent pebbles and cobbles; neutral; abrupt wavy boundary.

IIA1b—24 to 37 inches; gray (10YR 5/1) stratified cobbly loamy sand and sandy loam, very dark gray (10YR 3/1) and dark gray (10YR 4/1) moist; common medium prominent reddish brown (5YR 5/4) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine to medium roots; 15 percent pebbles, 15 percent cobbles, 5 percent stones; neutral; abrupt wavy boundary.

IIC2—37 to 55 inches; light yellowish brown (10YR 6/4) and reddish brown (5YR 5/4) extremely gravelly loamy sand, common medium prominent yellowish brown (10YR 5/4) and reddish brown (5YR 5/4) mottles; moist; single grained; loose; nonsticky and nonplastic; common very fine to medium roots; 50 percent pebbles, 20 percent cobbles, 5 percent stones; neutral.

The soil profile is deeper than 40 inches. Reaction throughout the profile ranges from slightly acid or neutral. The control section (between depths of 10 inches and 40 inches) is coarser than loamy fine sand. It is 3 to 10 percent clay and is 35 to 90 percent rock fragments.

Depth to mottles ranges from 7 to 20 inches. Many pedons have a buried A horizon.

Oest Series

The Oest series consists of very deep, well drained soils on terraces, alluvial fans, and escarpments. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 50 percent.

Typical pedon of Oest bouldery sandy loam, 2 to 8 percent slopes, 200 feet north and 600 feet west of the east quarter corner of sec. 19, T. 19 N., R. 18 E.

A1—0 to 14 inches; grayish brown (10YR 5/2) bouldery sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; 15 percent pebbles, 5 percent cobbles, 3 percent boulders; slightly acid; clear smooth boundary.

B21t—14 to 28 inches; light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 4/4) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common moderately thick clay films on ped faces and rock fragments; 30 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid; gradual wavy boundary.

B22t—28 to 40 inches; light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few moderately thick clay films on rock fragments; 40 percent pebbles, 10 percent cobbles, 5 percent stones; slightly acid; gradual wavy boundary.

C1—40 to 50 inches; pale brown (10YR 6/3) very gravelly loamy sand, brown (7.5YR 4/4) moist; single grained; loose, nonsticky and nonplastic; 50 percent pebbles, 10 percent cobbles, 1 to 5 percent stones; slightly acid.

The solum ranges from 30 to 54 inches in thickness. Reaction ranges from slightly acid to neutral throughout the profile.

The Bt horizon is heavy sandy loam or sandy clay loam and is 40 to 60 percent rock fragments. The average clay content is 18 to 25 percent.

Old Camp Series

The Old Camp series consists of shallow, well drained soils on uplands. These soils formed in residuum mainly of basic igneous rocks. Slopes are 8 to 50 percent.

Typical pedon of Old Camp stony sandy loam, 15 to 30 percent slopes, 1,200 feet east and 2,000 feet north of the southwest corner of sec. 33, T. 19 N., R. 20 E.

Pebbles cover 30 percent of the surface, cobbles cover 10 percent, and stones cover 3 percent.

A11—0 to 2 inches; grayish brown (10YR 5/2) stony loamy sand, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine tubular pores; 10 percent pebbles, 3 percent stones; neutral; abrupt smooth boundary.

A12—2 to 7 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 20 percent pebbles; neutral; clear smooth boundary.

B2t—7 to 11 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, friable, sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; common thin clay films bridging sand grains and coarse fragments and in pores; 15 percent pebbles, 25 percent cobbles; neutral; clear wavy boundary.

B3t—11 to 17 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and nonplastic; many very fine and fine roots; few very fine tubular pores; few thin clay films coating coarse fragments; 20 percent pebbles, 25 percent cobbles; neutral; gradual wavy boundary.

R—17 to 21 inches; pale brown fractured andesite with lime and silica coating in cracks.

Thickness of the solum and depth to hard bedrock range from 10 to 20 inches. Reaction is neutral to mildly alkaline in the upper part of the solum and neutral to moderately alkaline in the lower part. The surface of the bedrock is lime coated. The control section is clay loam, sandy clay loam, or loam and is 25 to 35 percent clay. It is 35 to 50 percent rock fragments.

Ophir Series

The Ophir series consists of very deep, poorly drained soils on alluvial fans and flood plains. These soils formed in alluvium derived mainly from granitic rock. Slopes are 0 to 8 percent.

Typical pedon of Ophir loamy sand, 2 to 8 percent slopes, 200 feet east and 2,150 feet south of the northwest corner of sec. 15, T. 16 N., R. 19 E.

All colors are for moist soil.

Ap1—0 to 5 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable, nonsticky and nonplastic; almost continuously matted with roots; slightly acid; clear smooth boundary.

A12—5 to 11 inches; very dark gray (10YR 3/1) loamy sand and loamy coarse sand; common medium prominent dark reddish brown (5YR 3/3) mottles; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine to medium roots; many fine to medium interstitial pores; 5 percent fine pebbles; medium acid; abrupt smooth boundary.

IIA13b—11 to 22 inches; black (10YR 2/1) loamy sand; fine prominent dark reddish brown (5YR 3/3) mottles; massive; very friable, nonsticky and nonplastic; few very fine to medium roots; many fine interstitial pores; 5 percent fine pebbles; medium acid; clear smooth boundary.

IIA14b—22 to 30 inches; very dark gray (10YR 3/1) loamy sand; many large prominent dark reddish brown (5YR 3/3) mottles; massive; very friable, nonsticky and nonplastic; few medium to very fine roots; common fine interstitial and tubular pores; 5 percent fine pebbles; medium acid; clear smooth boundary.

IIC1—30 to 36 inches; dark grayish brown (2.5Y 4/2) loamy sand; many medium common dark reddish brown (5YR 3/3) mottles; massive; very friable, nonsticky and nonplastic; 5 percent fine pebbles; medium acid; clear smooth boundary.

IIC2—36 to 60 inches; dark grayish brown (2.5Y 4/2) loamy sand; many large prominent yellowish red (5YR 5/6) mottles; single grained; loose, nonsticky and nonplastic; 5 percent pebbles; medium acid.

The soil profile is deeper than 60 inches. The mollic epipedon is 10 to 23 inches thick. Reaction throughout the profile ranges from neutral to medium acid.

The control section (between depths of 10 inches and 40 inches) is sand, loamy coarse sand, and loamy sand with thin strata of sandy loam. Clay content in the control section ranges from 3 to 10 percent. Gravel content ranges from 5 to 30 percent.

Oppio Series

The Oppio series consists of moderately deep, well drained soils on uplands. These soils formed in material weathered mainly from andesite and other volcanic rocks. Slopes are 4 to 50 percent.

Typical pedon of Oppio cobbly sandy loam, 8 to 15 percent slopes, 700 feet east and 2,200 feet north of the southwest corner of sec. 13, T. 20 N., R. 19 E.

About 3 percent of the surface is covered with cobbles.

A1—0 to 3 inches; pale brown (10YR 6/3) cobbly sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular and interstitial pores; 15 to 20 percent cobbles; slightly acid; clear wavy boundary.

B1t—3 to 8 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 4/3) moist; moderate fine prismatic structure parting to strong very fine granular; slightly hard, friable, very sticky and very plastic; common very fine roots; many very fine tubular and interstitial pores; neutral; abrupt smooth boundary.

B21t—8 to 14 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; strong medium and coarse prismatic structure; very hard, firm, very sticky and very plastic; common very fine to medium roots; few very fine tubular pores; many moderately thick and few thick clay films on ped faces and in pores; neutral; clear irregular boundary.

B22t—14 to 21 inches; pale brown (10YR 6/3) clay, dark brown (10YR 4/3) moist; common fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many moderately thick and few thick clay films on ped faces and in pores; neutral; abrupt broken boundary.

R—21 inches; fractured, weathered andesite bedrock; common very fine roots in cracks; few thin clay films in cracks.

The thickness of the solum and depth to bedrock range from 20 to 40 inches. Reaction ranges from medium acid to mildly alkaline throughout the profile. The Bt horizon is clay, sandy clay, or clay loam and is 35 to 50 percent clay. It is 0 to 35 percent gravel.

Orr Series

The Orr series consists of very deep, well drained soils on terraces and alluvial fans. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 8 percent.

Typical pedon of Orr stony sandy loam, 4 to 8 percent slopes, 1,200 feet east and 1,500 feet south of the northwest corner of sec. 8, T. 19 N., R. 18 E.

A11p—0 to 5 inches; brown (10YR 5/3) stony sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and nonplastic; many very fine to medium roots; 5 to 10 percent pebbles, 1 percent stones; neutral; clear wavy boundary.

A12—5 to 10 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; 5 percent pebbles; neutral; clear smooth boundary.

B1t—10 to 31 inches; pale brown (10YR 6/3) heavy sandy loam, brown (10YR 4/3) moist; very dark grayish brown (10YR 3/2) faces; weak medium angular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few very thin clay films on ped faces; 10 percent pebbles; neutral; gradual wavy boundary.

B2t—31 to 39 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, firm, sticky and plastic; few fine and medium roots; common thin clay films in pores; 10 percent pebbles; neutral; gradual wavy boundary.

B3t—39 to 50 inches; light yellowish brown (10YR 6/4) gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; massive; hard, firm, sticky and slightly plastic; few fine and medium roots; common thin clay films on ped faces; 20 percent pebbles; neutral; gradual wavy boundary.

C1—50 to 62 inches; very pale brown (10YR 7/3) gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine and medium roots; 30 percent pebbles; neutral.

The soil profile is deeper than 60 inches. Reaction ranges from slightly acid to neutral throughout the profile.

The upper 20 inches of the Bt horizon is sandy loam or sandy clay loam and is 18 to 25 percent clay. The gravel content averages 10 to 35 percent.

Orr Variant

The Orr Variant consists of very deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Orr Variant gravelly sandy loam, 2,500 feet east and 2,000 feet north of the southwest corner of sec. 33, T. 21 N., R. 19 E.

About 30 percent of the surface is covered with gravel.

A11—0 to 3 inches; brown (10YR 5/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 60 percent pebbles; neutral; clear smooth boundary.

A12—3 to 11 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine tubular and interstitial pores; 10 percent pebbles; neutral; clear smooth boundary.

A13—11 to 18 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; common very fine and fine tubular and interstitial pores; neutral; abrupt wavy boundary.

B1t—18 to 28 inches; light yellowish brown (10YR 6/4) heavy sandy clay loam, dark yellowish brown (10YR 3/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine and medium roots; few very fine tubular pores; few thin clay films in pores; neutral; clear wavy boundary.

B21t—28 to 39 inches; light yellowish brown (10YR 6/4) sandy clay loam, brown (10YR 4/3) moist; massive; hard, friable, sticky and plastic; few very fine tubular pores; many thin clay films coating and bridging sand grains and in pores; moderately alkaline; abrupt wavy boundary.

IIB3ca—39 to 54 inches; light yellowish brown (10YR 6/4) silty clay loam, dark yellowish brown (10YR 4/4) moist; many medium distinct white (10YR 8/2) mottles; massive; hard, friable, sticky and plastic; few very fine interstitial pores; common thin clay films bridging sand grains; slightly effervescent; moderately alkaline; abrupt wavy boundary.

IIC1—54 to 65 inches; light brownish gray (10YR 6/2) silty clay loam, dark brown (10YR 3/3) moist; massive; hard, friable, sticky and plastic; moderately alkaline.

The solum ranges from 40 to 60 inches in thickness. Reaction ranges from slightly acid to moderately alkaline throughout the profile. The Bt horizon is sandy clay loam or clay loam. It is 20 to 35 percent clay.

Osobb Series

The Osobb series consists of shallow, well drained soils on rounded ridges and hillsides. These soils formed

in residuum of mixed volcanic rock sources. Slopes are 8 to 50 percent.

Typical pedon of Osobb extremely stony fine sandy loam, in an area of Osobb-Rezave-Fireball association, 500 feet west and 1,200 feet south of the northeast corner of sec. 32, T. 22 N., R. 24 E.

A1—0 to 2 inches; pale brown (10YR 6/3) extremely stony fine sandy loam, brown (10YR 4/3) moist; weak thin platy structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine tubular and interstitial pores; 30 percent pebbles, 10 percent cobbles, 50 percent stones; strongly effervescent; moderately alkaline; clear smooth boundary.

B2—2 to 11 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine, fine, and medium tubular pores; 35 percent pebbles, 15 percent cobbles, 5 percent stones; strongly effervescent; strongly alkaline; abrupt wavy boundary.

C1sicam—11 to 13 inches; very pale brown (10YR 8/3) indurated pan, pale brown (10YR 6/3) moist; massive; extremely hard, extremely firm; strongly effervescent; very strongly alkaline; abrupt wavy boundary.

R—13 inches; fractured very hard basalt bedrock.

The depth to the duripan ranges from 8 to 20 inches. Reaction ranges from mildly alkaline in the upper part of the profile to very strongly alkaline in the lower part.

These soils are loam, fine sandy loam, or very fine sandy loam and are 12 to 18 percent clay. They are 55 to 80 percent rock fragments.

Pahrange Series

The Pahrange series consists of moderately deep, well drained soils that formed in residuum and colluvium mainly from rhyolite. Pahrange soils are on mountain slopes. Slopes are 15 to 70 percent.

Typical pedon of Pahrange very stony sandy loam, in an area of Skedaddale-Pahrange-Lemm association, 1,200 feet east and 2,600 feet south of the northwest corner of sec. 26, T. 23 N., R. 12 E.

A11—0 to 4 inches; brown (10YR 5/3) very stony sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; 25 percent pebbles, 5 percent cobbles, 10 percent stones; slightly acid; clear smooth boundary.

A12—4 to 11 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and medium roots; many very fine and medium tubular pores; few thin clay films on ped faces, in pores, and coating rock fragments; 35 percent pebbles, 5 percent cobbles; neutral; abrupt wavy boundary.

B21t—11 to 20 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots; few fine tubular pores; many thin clay films on ped faces, in pores, and coating rock fragments; 20 percent gravel; neutral; gradual smooth boundary.

B22t—20 to 26 inches; brownish yellow (10YR 6/6) clay loam, yellowish brown (10YR 5/6) moist; moderate medium prismatic structure; hard, friable, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; 15 percent gravel; neutral; abrupt smooth boundary.

Cr—26 to 39 inches; soft weathered rock with very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist, between fragments.

R—39 to 43 inches; hard, fractured, silica- and clay-coated rhyolitic bedrock.

Thickness of the solum and depth to bedrock range from 20 to 40 inches.

Reaction throughout the profile is slightly acid or neutral. The Bt horizon is clay loam. It is 27 to 35 percent clay and is 15 to 35 percent rock fragments.

Parran Series

The Parran series consists of very deep, poorly drained and somewhat poorly drained soils on basins and low lake terraces. These soils formed in alluvium and lacustrine deposits derived from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Parran silty clay loam, 2,400 feet north and 400 feet west of the southeast corner of sec. 22, T. 23 N., R. 20 E.

A11—0 to 5 inches; light brownish gray (10YR 6/2) silty clay loam, olive gray (5YR 4/2) moist; moderate medium platy structure parting to moderate fine subangular blocky; slightly hard, firm, sticky and plastic; many very fine, fine, and medium roots; many very fine and fine interstitial and tubular pores; common fine salt crystals form thin surficial crust; slightly effervescent; very strongly alkaline; clear smooth boundary.

A12sa—5 to 13 inches; light gray (2.5Y 7/2) silty clay, light brownish gray (2.5Y 6/2) moist, moderate fine subangular blocky structure; firm, sticky and plastic; many very fine, fine, and medium and few coarse roots; many very fine and fine interstitial and tubular

pores; disseminated salts; slightly effervescent; strongly alkaline; clear smooth boundary.

C1sa—13 to 34 inches; light gray (2.5Y 7/2) silty clay, light brownish gray (2.5Y 6/2) moist; common fine prominent brown (7.5YR 5/4) mottles; massive; firm, sticky and plastic; few fine and common dead roots; common medium tubular pores; many fine and medium salt crystals; slightly effervescent; very strongly alkaline; clear smooth boundary.

C2—34 to 60 inches; light gray (5Y 7/2) silty clay, light olive gray (5Y 6/2) moist; massive; firm, sticky and very plastic; many medium dead roots; common medium tubular pores; strongly effervescent; strongly alkaline.

The solum ranges from 5 to 18 inches in thickness. The salic horizon ranges from 15 to 29 inches in thickness and typically has its upper boundary at the soil surface during the dry season. Reaction throughout the profile is moderately alkaline to very strongly alkaline. The control section (between depths of 10 and 40 inches) averages silty clay or clay. It is 40 to 55 percent clay.

Pirouette Series

The Pirouette series consists of shallow, well drained soils on rounded ridgetops and concave depressions. These soils formed in residuum of basalt, altered andesite, and tuff. Slopes are 0 to 8 percent.

Typical pedon of Pirouette very stony very fine sandy loam, in an area of Pirouette-Osobb-Rock outcrop association, 1,800 feet south and 1,800 feet east of the northwest corner of sec. 34, T. 22 N., R. 24 E.

A1—0 to 3 inches; pale brown (10YR 6/3) very stony very fine sandy loam, brown (10YR 4/3) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine vesicular pores; 10 percent pebbles, 20 percent cobbles, 10 percent stones; moderately alkaline; clear smooth boundary.

B2t—3 to 9 inches; light brown (7.5YR 6/4) very gravelly light clay loam, dark brown (7.5YR 4/4) moist; weak fine prismatic structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine tubular pores; common moderately thick clay films coating rock fragments and pores; 25 percent pebbles, 10 percent cobbles; slightly effervescent; moderately alkaline; clear smooth boundary.

B3t—9 to 10 inches; light brown (7.5YR 6/4) very gravelly light clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine tubular pores; few thin clay films coating rock fragments; 25 percent pebbles, 10 percent cobbles; strongly effervescent; strongly alkaline; clear smooth boundary.

C1sica—10 to 15 inches; light brown (7.5YR 6/4) very cobbly sandy loam, brown (7.5YR 5/4) moist; massive; hard, firm, nonsticky and nonplastic; few very fine roots; few very fine tubular and interstitial pores; 40 percent pebbles, 30 percent cobbles, 5 percent stones; strongly effervescent; strongly alkaline; clear smooth boundary.

C2sicam—15 to 16 inches; indurated silica-cemented hardpan.

R—16 inches; altered tuff bedrock.

The solum is 8 to 14 inches thick. The depth to the duripan capping bedrock ranges from 11 to 20 inches. Reaction throughout the profile is moderately alkaline to strongly alkaline. The control section is clay loam. It is 28 to 35 percent clay and 35 to 50 percent rock fragments.

Pizene Series

The Pizene series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 4 percent.

Typical pedon of Pizene sandy loam, 0 to 4 percent slopes, 2,500 feet east and 1,500 feet south of the northwest corner of sec. 13, T. 23 N., R. 20 E.

A11—0 to 2 inches; light brownish gray (10YR 6/2) gravelly loamy sand, brown (10YR 4/3) moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 25 percent pebbles, 3 percent cobbles; moderately alkaline; abrupt smooth boundary.

A12—2 to 6 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine vesicular and tubular pores; 10 percent pebbles; moderately alkaline; abrupt smooth boundary.

B2t—6 to 14 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse prismatic structure; hard, firm, sticky and plastic; common very fine to medium roots; many very fine and medium tubular pores; common thin and moderately thick clay films on ped faces and in pores; 10 percent pebbles; moderately alkaline; clear smooth boundary.

B3t—14 to 21 inches; light yellowish brown (10YR 6/4) sandy loam with pockets of gravel, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine to medium roots; common very fine to medium tubular

pores; few thin clay films coating sand grains and in pores; 10 percent pebbles; slightly effervescent; very strongly alkaline; gradual smooth boundary.

C1—21 to 32 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; very few roots; common very fine to medium tubular pores; 5 percent durinodes; 15 percent pebbles; strongly effervescent; very strongly alkaline; abrupt smooth boundary.

C2—32 to 36 inches; pale brown (10YR 6/3) very gravelly light coarse sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; common very fine to medium roots; very fine and fine interstitial and few fine and medium tubular pores; 50 percent pebbles, 5 percent cobbles; strongly effervescent; very strongly alkaline; abrupt smooth boundary.

C3—36 to 41 inches; pale brown (10YR 6/3) coarse sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine to medium roots; many very fine and fine interstitial and few very fine tubular pores; 5 percent pebbles; slightly effervescent; very strongly alkaline; abrupt smooth boundary.

C4—41 to 61 inches; pale brown (10YR 6/3) loamy very fine sand, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine tubular pores; slightly effervescent; very strongly alkaline.

Thickness of the solum ranges from 12 to 25 inches. Reaction throughout the profile ranges from moderately alkaline to very strongly alkaline.

The Bt horizon is sandy clay loam or heavy sandy loam. It is 18 to 25 percent clay.

Depth to free carbonates is 12 to 18 inches. The exchangeable bases are 15 to 35 percent sodium.

Railcity Series

The Railcity series consists of very deep, somewhat excessively drained soils on landslides. These soils formed in granitic colluvium derived mainly from giant landslides. Slopes are 8 to 50 percent.

Typical pedon of Railcity very bouldery coarse sand, 15 to 50 percent slopes, 2,500 feet west and 2,600 feet north of the southeast corner of sec. 33, T. 17 N., R. 19 E.

O—1.5 inches to 0; pine needle duff.

A11—0 to 6 inches; grayish brown (10YR 5/2) very bouldery coarse sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; many fine and very fine roots; many very fine and fine interstitial pores; 20 percent pebbles, 2 percent stones, 3 percent boulders; medium acid; clear smooth boundary.

A12—6 to 12 inches; brown (10YR 5/3) gravelly sand, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and medium and common very fine roots; many fine to medium interstitial pores; 20 percent fine pebbles, 10 percent coarse pebbles, 5 percent cobbles; slightly acid; clear wavy boundary.

C1—12 to 25 inches; pale brown (10YR 6/3) very gravelly coarse sand, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; many medium and coarse, common fine, and few very fine roots; many fine interstitial pores; 20 percent fine pebbles, 5 percent coarse pebbles, 15 percent cobbles that are highly weathered; few thin bands of sandy loam; medium acid; gradual irregular boundary.

C2—25 to 60 inches; pale brown (10YR 6/3) very gravelly loamy sand, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; many coarse and medium, common fine, and few very fine roots; many fine interstitial pores; 40 percent fine pebbles, 30 percent decomposed cobbles and stones; few thin bands of sandy loam; medium acid.

The soil profile is deeper than 60 inches. Reaction is medium acid or slightly acid throughout the profile. The control section (between depths of 10 and 40 inches) is coarse sand or loamy sand. It is 2 to 8 percent clay and is 35 to 70 percent rock fragments.

Rednik Series

The Rednik series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived from mixed rock sources. Slopes are 4 to 15 percent.

Typical pedon of Rednik very gravelly sandy loam, 4 to 8 percent slopes, 50 feet west and 1,300 feet south of the northeast corner of sec. 13, T. 23 N., R. 20 E.

A11—0 to 1 inch; light brownish gray (10YR 6/2) very gravelly sandy loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 30 percent pebbles, 5 percent cobbles and stones; moderately alkaline; abrupt smooth boundary.

A12—1 inch to 4 inches; pale brown (10YR 6/3) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium and coarse subangular blocky structure parting to weak thin platy; slightly hard, very friable, nonsticky and nonplastic; common very fine through medium roots; common very fine and fine tubular pores; 30 percent pebbles, 5 percent

cobbles and stones; mildly alkaline; clear smooth boundary.

B1—4 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine, fine, and medium tubular pores; 15 percent pebbles, 5 percent cobbles; strongly effervescent; strongly alkaline; clear smooth boundary.

B2t—6 to 20 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium angular blocky structure in matrix; hard, friable, sticky and plastic; common very fine and fine roots; common very fine through medium tubular pores; common thin and moderately thick clay films on ped faces and in pores; 55 percent pebbles, 5 percent cobbles; strongly effervescent; strongly alkaline; abrupt wavy boundary.

C1ca—20 to 25 inches; pinkish gray (7.5YR 6/2) gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores and common fine tubular pores; 25 percent pebbles; violently effervescent; strongly alkaline; clear wavy boundary.

IIC2ca—25 to 34 inches; pinkish gray (7.5YR 6/2) very gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores and common fine tubular pores; 50 percent pebbles; violently effervescent; strongly alkaline; clear wavy boundary.

IIIC3ca—34 to 48 inches; pinkish gray (7.5YR 6/2) gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores and common fine tubular pores; 30 percent gravel; violently effervescent; strongly alkaline; clear wavy boundary.

IIIC4ca—48 to 57 inches; pinkish gray (7.5YR 6/2) very gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores and few fine tubular pores; 45 percent pebbles; violently effervescent; strongly alkaline; clear wavy boundary.

IIIC5—57 to 65 inches; pinkish gray (7.5YR 6/2) very gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 40 percent pebbles, 5 percent cobbles; violently effervescent; very strongly alkaline.

The solum thickness is 15 to 30 inches. Reaction ranges from mildly alkaline to very strongly alkaline throughout the profile. The B2t horizon is sandy clay loam, sandy loam, or loam. It is 18 to 27 percent clay and is 35 to 75 percent rock fragments.

Reno Series

The Reno series consists of moderately deep, well drained soils on pediments and river or stream terraces. These soils formed in fluvial sediment and alluvium derived from mixed rock sources. Slopes are 2 to 15 percent.

Typical pedon of Reno very stony fine sandy loam, 8 to 15 percent slopes, 2,000 feet east and 200 feet south of the northwest corner of sec. 29, T. 19 N., R. 18 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) very stony fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; loose, friable, sticky and slightly plastic; common very fine and fine roots; many fine interstitial pores; 15 percent pebbles, 15 percent cobbles, 5 percent stones; neutral; abrupt smooth boundary.

B21t—2 to 5 inches; yellowish brown (10YR 5/4) clay, dark brown (10YR 3/3) moist; moderate medium prismatic structure; hard, very firm, sticky and plastic; many fine and medium roots; many fine and medium tubular pores; common moderately thick clay films on ped faces and in pores; neutral; clear smooth boundary.

B22t—5 to 16 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; strong medium prismatic structure; hard, very firm, very sticky and very plastic; common very fine and few fine and medium roots; common very fine pores; many thick clay films on ped faces; neutral; clear wavy boundary.

B3t—16 to 24 inches; light yellowish brown (10YR 6/4) cobbly clay, dark yellowish brown (10YR 4/4) moist; massive; hard, very firm, sticky and plastic; very few roots; very few pores; common thick clay films on coarse fragments; strong silica coatings on undersides of coarse fragments; 15 percent pebbles, 15 percent cobbles; neutral; abrupt wavy boundary.

C1sim—24 to 47 inches; white (10YR 8/2) gravelly and cobbly strongly silica-cemented duripan; neutral; clear smooth boundary.

C2si—47 to 60 inches; very pale brown (10YR 7/4) weakly silica-cemented cobbly tuffaceous material that wets up to cobbly fine sandy loam.

Thickness of the solum ranges from 20 to 36 inches. Depth to the indurated duripan ranges from 20 to 40 inches. Reaction ranges from slightly acid to neutral in the upper part of the profile and from neutral to moderately alkaline in the lower part.

The control section is clay that is 40 to 60 percent clay. It averages 0 to 35 percent rock fragments, but the content of fragments ranges higher in the lower part.

Reywat Series

The Reywat series consists of shallow, well drained soils on uplands. These soils formed in residuum mainly of basic igneous rocks. Slopes are 8 to 50 percent.

Typical pedon of Reywat extremely stony loam, in an area of Reywat-Rock outcrop complex, 15 to 50 percent slopes, 215 feet east and 2,425 feet south of the northwest corner of sec. 27, T. 19 N., R. 20 E.

A11—0 to 3 inches; grayish brown (10YR 5/2) extremely stony loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine and very fine pores; 10 percent pebbles, 5 percent cobbles, 20 percent stones; slightly acid; clear smooth boundary.

A12—3 to 6 inches; grayish brown (10YR 5/2) stony loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine and very fine pores; 10 percent pebbles, 5 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

B1t—6 to 12 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 4/3) moist; weak fine angular blocky structure; slightly hard, friable, sticky and slightly plastic; many fine and very fine roots; many fine and very fine pores; common thin clay films on ped faces, few thin clay films in pores; 15 percent pebbles, 20 percent cobbles; neutral; clear wavy boundary.

B2t—12 to 14 inches; yellowish brown (10YR 5/4) very cobbly clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, sticky and plastic; common very fine roots; common very fine pores; common thin clay films on ped faces; few thin clay films in pores; 10 percent pebbles, 40 percent cobbles; neutral; abrupt irregular boundary.

R—14 to 20 inches; fractured, hard, basaltic bedrock with some clay in the fractures; very slightly effervescent in some spots.

Thickness of the solum and depth to hard bedrock range from 10 to 20 inches. The mollic epipedon is 4 to 10 inches thick. Reaction throughout the profile ranges from slightly acid to mildly alkaline. The control section is loam or clay loam. It is 24 to 35 percent clay and is 35 to 50 percent rock fragments.

Rezave Series

The Rezave series consists of shallow, well drained soils that formed in residuum mainly of basalt. These soils are on uplands. Slopes are 0 to 15 percent.

Typical pedon of Rezave extremely stony very fine sandy loam, in an area of Osobb-Rezave-Fireball association, 1,000 feet north and 1,200 feet west of the southeast corner of sec. 7, T. 21 N., R. 25 E.

A1—0 to 4 inches; light brownish gray (10YR 6/2) extremely stony very fine sandy loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine and fine tubular pores; 15 percent stones, 5 percent cobbles, 10 percent pebbles; mildly alkaline; abrupt smooth boundary.

B2t—4 to 13 inches; light yellowish brown (10YR 6/4) stony clay, dark yellowish brown (10YR 4/4) moist; strong medium and coarse prismatic structure; hard, friable, sticky and plastic; few very fine and fine and common medium roots; few very fine through medium tubular pores; 10 percent stones, 5 percent cobbles, 5 percent pebbles; common moderately thick clay films on faces of peds and in pores; slightly effervescent; strongly alkaline; abrupt wavy boundary.

B2tcasi—13 to 17 inches; reddish yellow (7.5YR 7/6) very gravelly clay, brownish yellow (10YR 6/6) moist; moderate fine to medium angular blocky structure; hard, brittle, sticky and plastic; few roots; few fine tubular pores; 10 percent stones, 5 percent cobbles, 30 percent pebbles, common thin and few moderately thick clay films on faces of peds and in pores; weak discontinuous silica cementation; violently effervescent; very strongly alkaline; clear broken boundary.

Ccasi—17 to 19 inches; white (10YR 8/1) very stony clay loam, pink (7.5YR 7/4) moist; massive; very hard, brittle, slightly sticky and slightly plastic; few fine roots; few very fine and fine tubular pores; 15 percent cementation; violently efervescent; very strongly alkaline; abrupt wavy boundary.

R—19 to 23 inches; hard, slightly fractured basalt.

Depth to hard bedrock is 14 to 20 inches. Reaction throughout the profile is neutral to very strongly alkaline. The Bt horizon is clay or heavy clay loam and is 35 to 55 percent clay.

Risley Series

The Risley series consists of moderately deep, well drained soils on uplands. These soils formed in material

weathered mainly from altered volcanic rock. Slopes are 8 to 30 percent.

Typical pedon of Risley cobbly loam, in an area of Risley-Xman-Rock outcrop association, 1,900 feet east and 900 feet south of the northwest corner of sec. 14, T. 24 N., R. 18 E.

A11—0 to 2 inches; brown (10YR 5/3) cobbly loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 10 percent pebbles, 10 percent cobbles; neutral; abrupt smooth boundary.

A12—2 to 6 inches; brown (10YR 5/3) cobbly clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and common medium roots; many very fine and fine tubular pores; 10 percent pebbles, 10 percent cobbles; neutral; abrupt smooth boundary.

B2t—6 to 18 inches; yellowish brown (10YR 5/4) clay, dark brown (7.5YR 4/4) moist; strong medium prismatic structure parting to strong medium angular blocky; very hard, friable, sticky and plastic; few very fine exped roots; few very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; mildly alkaline; clear smooth boundary.

B3ca—18 to 28 inches; brownish yellow (10YR 6/6) clay loam, yellowish brown (10YR 5/6) moist; massive; very hard, friable, sticky and plastic; few fine roots; few very fine and fine tubular pores; strongly effervescent; moderately alkaline; gradual smooth boundary.

Cr—28 to 40 inches; highly weathered and altered andesite bedrock with lime seams and clay films in fractures.

The thickness of the solum and depth to weathered bedrock range from 20 to 40 inches. Reaction throughout the profile ranges from medium acid to moderately alkaline. The Bt horizon is clay, clay loam, or sandy clay and is 35 to 45 percent clay.

Rose Creek Series

The Rose Creek series consists of very deep, poorly drained soils on flood plains. Drainage has been altered. These soils formed in alluvium from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Rose Creek fine sandy loam, 2,000 feet west and 1,600 feet south of the northeast corner of sec. 17, T. 19 N., R. 20 E.

Ap1p—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; common very fine to medium pores; 10 percent pebbles; effervescent; moderately alkaline; clear smooth boundary.

A12—8 to 16 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; common medium prominent strong brown (7.5YR 5/6) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; many fine to medium roots; common very fine to medium pores; 10 percent pebbles; effervescent; moderately alkaline; clear smooth boundary.

C1—16 to 60 inches; light brownish gray (10YR 6/2) stratified very fine sandy loam, gravelly loamy sand, sandy loam, dark grayish brown (10YR 4/2) moist; common medium prominent strong brown (7.5YR 5/6) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine to medium roots; few very fine to medium pores; effervescent; moderately alkaline.

The soil profile is deeper than 60 inches. The mollic epipedon is 10 to 18 inches deep. Reaction throughout the profile ranges from mildly alkaline to moderately alkaline. The control section is stratified and has texture of sandy loam, fine sandy loam, very fine sandy loam, or loam. It is more than 15 percent fine or coarse sand and 5 to 18 percent clay. In pedons where texture is the coarser part of the range, the control section is 0 to 20 percent gravel.

Mottles are common below the upper part of the A horizon. The lower part of the C horizon is highly mottled or gleyed.

Rose Creek Variant

The Rose Creek Variant consists of very deep, moderately well drained soils on flood plains. These soils formed in alluvium from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Rose Creek Variant sandy loam, 1,800 feet east and 200 feet north of the southwest corner of sec. 14, T. 23 N., R. 20 E.

A11—0 to 5 inches; light brownish gray (10YR 6/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate, medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine through coarse roots; many very fine through medium tubular pores; 10 percent pebbles; slightly effervescent; strongly alkaline; abrupt smooth boundary.

B2—5 to 12 inches; light brownish gray (10YR 6/2) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky

structure; hard, very friable, slightly sticky and slightly plastic; many very fine through coarse roots; many very fine through medium tubular pores; 10 percent pebbles; slightly effervescent; strongly alkaline; abrupt smooth boundary.

IIC1ca—12 to 31 inches; light brownish gray (10YR 6/2) loamy sand, very dark grayish brown (10YR 3/2) moist; massive; loose, nonsticky and nonplastic; many very fine through coarse roots; many very fine, fine, and medium interstitial and tubular pores; 15 percent gravel; strongly effervescent; strongly alkaline; abrupt smooth boundary.

IIIA12—31 to 35 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark brown (10YR 2/2) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine through medium roots; common very fine through medium tubular pores; 10 percent pebbles; strongly effervescent; strongly alkaline; abrupt smooth boundary.

IVC2—35 to 60 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; few fine and medium roots; few fine and medium tubular pores; 10 percent pebbles; strongly effervescent; strongly alkaline.

The thickness of the solum ranges from 12 to 25 inches. Reaction throughout the profile is moderately alkaline to strongly alkaline. The control section is loam, loamy sand, very fine sandy loam, fine sandy loam, or sandy loam and is 10 to 18 percent clay. It is 8 to 20 percent rock fragments.

Ruhe Series

The Ruhe series consists of shallow, well drained soils on tufa-controlled terraces. These soils formed in mixed, sandy alluvium with an admixture of eolian sand. Slopes are 0 to 15 percent.

Typical pedon of Ruhe gravelly loamy sand, in an area of Hawsley-Ruhe-Bluewing association, 2,600 feet west and 1,200 feet north of the southeast corner of sec. 21, T. 24 N., R. 23 E.

A11—0 to 1 inch; pale brown (10YR 6/3) gravelly loamy sand, dark brown (10YR 3/3) moist; single grained; loose, nonsticky and nonplastic; very few fine through medium roots; many very fine interstitial pores; 20 percent pebbles; strongly effervescent; strongly alkaline; clear smooth boundary.

A12—1 inch to 6 inches; pale brown (10YR 6/3) gravelly loamy sand, brown (10YR 4/3) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine through medium roots; many very fine interstitial and common very fine tubular pores; 20 percent pebbles; violently effervescent; strongly alkaline; clear smooth boundary.

C1ca—6 to 14 inches; light brownish gray (10YR 6/2) gravelly loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial and common very fine tubular pores; 20 percent pebbles; violently effervescent; strongly alkaline; abrupt wavy boundary.

IIC2r—14 to 35 inches; light gray (10YR 7/1) tufa, very pale brown (10YR 7/4) moist; massive; extremely hard, brittle; common very fine through medium roots in fractures and channels only; violently effervescent; very strongly alkaline; clear irregular boundary.

IIIC3ca—35 to 60 inches; light brownish gray (10YR 6/2) stratified very cobbly coarse sand, dark grayish brown (10YR 4/2) moist; single grained; loose, nonsticky and nonplastic; many very fine and fine interstitial pores; 20 percent pebbles, 45 percent cobbles, 10 percent stones; violently effervescent; very strongly alkaline.

Depth to the weathered tufa layer is 14 to 20 inches. Reaction throughout the profile ranges from moderately alkaline to very strongly alkaline.

The control section is sand or loamy sand and is 0 to 5 percent clay. It is 0 to 35 percent rock fragments.

Sagouspe Series

The Sagouspe series consists of very deep, somewhat poorly drained soils on flood plains and low terraces. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Sagouspe sand, 2,800 feet east and 2,200 feet south of the northwest corner of sec. 10, T. 18 N., R. 20 E.

A11—0 to 6 inches; light brownish gray (10YR 6/2) sand, dark grayish brown (10YR 4/2) moist; single grained; loose, nonsticky and nonplastic; few medium and fine roots; neutral; clear smooth boundary.

C1—6 to 21 inches; light brownish gray (10YR 6/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; single grained; loose, nonsticky and nonplastic; common medium to very fine roots; mildly alkaline; abrupt smooth boundary.

IIC2—21 to 22 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; common medium faint strong brown (7.5YR 5/6) mottles; weak thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few medium and fine roots; strongly alkaline; abrupt smooth boundary.

IIIC3—22 to 32 inches; light gray (10YR 7/2) loamy sand, brown (10YR 4/3) moist; common fine prominent brown (7.5YR 5/4) mottles; single

grained; loose, nonsticky and nonplastic; few medium and fine roots; moderately alkaline; clear smooth boundary.

IVC4—32 to 35 inches; light gray (10YR 7/2) silty loam, dark grayish brown (2.5Y 4/2) moist; common fine prominent strong brown (7.5YR 5/6) mottles; weak thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; few medium and fine roots; strongly alkaline; clear smooth boundary.

VC5—35 to 47 inches; light gray (10YR 7/2) gravelly sand, dark grayish brown (10YR 4/2) moist; single grained; loose, nonsticky and nonplastic; 20 percent pebbles; moderately alkaline; clear smooth boundary.

VIA12b—47 to 60 inches; light brownish gray (10YR 6/2) stratified silty clay loam and very fine sandy loam, dark grayish brown (2.5Y 4/2) moist; many large prominent olive brown (2.5Y 4/4) mottles; massive; hard, friable, slightly sticky and slightly plastic; strongly alkaline.

The soil profile is deeper than 60 inches. Reaction ranges from mildly alkaline to strongly alkaline throughout the profile. The control section is stratified and has average texture of loamy sand or loamy fine sand. It is 0 to 10 percent clay. Common fine and medium distinct to prominent mottles occur at depths of 6 to 40 inches.

Sagouspe Variant

The Sagouspe Variant consists of very deep, poorly drained soils on flood plains and lake terraces. These soils formed in alluvium derived from mixed rock. The slope is 0 to 2 percent.

Typical pedon of Sagouspe Variant loamy very fine sand, wet, 2,600 feet east and 2,500 feet south of the northwest corner of sec. 3, T. 16 N., R. 19 E.

O—2.5 inches to 0; root mat.

Ap1—0 to 5 inches; gray (5Y 6/1) loamy very fine sand with thin lenses of heavy silt loam, dark gray (5Y 4/1) moist with pockets of very dark gray (10YR 3/1) moist; many large prominent reddish brown (5YR 4/3) mottles; weak medium platy structure; very friable, nonsticky and nonplastic; many medium to very fine roots; slightly acid; abrupt smooth boundary.

C1—5 to 22 inches; light gray (10YR 7/1) stratified sand and fine sand, light gray (10YR 6/1) moist; many large prominent yellowish red (5YR 4/6) mottles; single grained; loose, nonsticky and nonplastic; common medium to very fine roots; neutral; abrupt smooth boundary.

IIC2—22 to 28 inches; greenish gray (5GY 6/1) stratified loamy very fine sand, greenish gray (5GY 5/1) moist, and silt loam, greenish gray (5GY 6/1) moist; moderate thin and medium platy structure; firm, the silt loam is slightly sticky and plastic, the loamy very fine sand is nonsticky and nonplastic; few medium to very fine roots; neutral; abrupt smooth boundary.

IIIC3—28 to 50 inches; light gray (N 7/0) sand, light gray (N 6/0) moist; many medium and large prominent greenish gray (5GY 6/1) mottles; single grained; loose, nonsticky and nonplastic; neutral.

The soil profile is more than 60 inches thick. The average texture of the control section (between depths of 10 inches and 40 inches) is loamy sand or loamy fine sand. The control section is 2 to 12 percent clay. Reaction throughout the profile ranges from slightly acid to neutral. Common fine mottles and medium distinct to prominent mottles are at a depth of 15 to 20 inches in most pedons.

Settlemeyer Series

The Settlemeyer series consists of very deep, poorly drained soils on alluvial fans and flood plains. These soils formed in alluvium derived from mixed rock. The slopes are 0 to 4 percent.

Typical pedon of Settlemeyer fine sandy loam, 0 to 2 percent slopes, 2,500 feet south and 1,000 feet east of the northwest corner of sec. 6, T. 18 N., R. 20 E.

A1—0 to 15 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, sticky and slightly plastic; many fine to coarse roots; many fine to coarse tubular pores; effervescent; moderately alkaline; abrupt smooth boundary.

C1—15 to 25 inches; light gray (N 6/0) clay loam, dark gray (N 4/0) moist; massive; firm, sticky and slightly plastic; common fine and many medium roots; common fine and medium tubular pores; effervescent in spots; moderately alkaline; abrupt smooth boundary.

IIC2g—25 to 39 inches; light olive brown (2.5YR 5/4) silty clay loam, olive brown (2.5YR 4/4) moist; many large prominent greenish gray (5GY 5/1) mottles and common medium prominent strong brown (7.5YR 5/6) mottles; massive; firm, sticky and plastic; very few roots; very few pores; moderately alkaline; abrupt smooth boundary.

IIIC3g—39 to 60 inches; greenish gray (5GY 5/1) stratified very gravelly loamy sand and silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; very friable, firm, nonsticky and nonplastic; sticky and plastic; very few roots; moderately alkaline.

The soil profile is more than 50 inches thick. The mollic epipedon is 12 to 23 inches thick. Reaction throughout the profile is moderately alkaline to strongly alkaline. The control section is stratified clay loam and

silty clay loam. It averages 25 to 35 percent clay and more than 15 percent fine or coarse sand.

The C horizon is mottled or gleyed.

Sibelia Series

The Sibelia series consists of deep, well drained soils on uplands. These soils formed in colluvium and residuum from mixed rock but dominantly andesite and basalt. Slopes are 15 to 50 percent.

Typical pedon of Sibelia very stony sandy loam, in an area of Meiss-Sibelia-Rock outcrop association, 2,000 feet west and 500 feet south of the northeast corner of sec. 23, T. 17 N., R. 18 E.

O1—7 inches to 0; pine litter duff.

A1—0 to 6 inches; grayish brown (10YR 5/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine through coarse roots; many very fine and fine interstitial pores, many fine through medium tubular pores; 10 percent pebbles, 10 percent cobbles, 10 percent stones; slightly acid; clear wavy boundary.

B2—6 to 14 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and common medium roots; many very fine through medium tubular pores; 30 percent pebbles, 5 percent cobbles; slightly acid; gradual wavy boundary.

C1—14 to 20 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many fine and common medium roots; many very fine through medium tubular pores; 30 percent pebbles, 5 percent cobbles; neutral; gradual wavy boundary.

C2—20 to 41 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; common very fine and fine tubular pores; 35 percent pebbles, 20 percent cobbles, 5 percent stones; neutral; clear wavy boundary.

C3—41 to 47 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; common very fine and fine tubular pores; 30 percent pebbles, 30 percent cobbles; neutral; clear wavy boundary.

R—47 inches; highly weathered and fractured andesite.

The solum thickness is 12 to 20 inches. Depth to bedrock is 40 to 60 inches. Reaction throughout the profile is slightly acid to neutral. The control section (between depths of 10 inches and 40 inches) is sandy loam and is 10 to 18 percent clay. It is 35 to 70 percent rock fragments.

Sibelia Variant

The Sibelia Variant consists of very deep, somewhat poorly drained soils on uplands. These soils formed in colluvium and residuum from mixed rock, but dominantly andesite and basalt. The slopes are 4 to 30 percent.

Typical pedon of Sibelia Variant stony loam, in an area of Carioca-Sibelia Variant-Fugawee association, 200 feet west and 2,200 feet south of the northeast corner of sec. 16, T. 18 N., R. 18 E.

O1—1 inch to 0; pine litter duff.

A1—0 to 10 inches; brown (10YR 5/3) stony loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine through coarse roots; common very fine and fine interstitial and tubular pores; 20 percent pebbles, 5 percent cobbles, 1 percent stones; medium acid; clear smooth boundary.

B2—10 to 21 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine through coarse roots; common very fine and fine vesicular and tubular pores; 20 percent pebbles, 10 percent cobbles; medium acid; diffuse wavy boundary.

C1—21 to 41 inches; yellowish brown (10YR 5/4) very cobbly loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine through coarse roots; common very fine through fine interstitial and tubular pores; 20 percent pebbles, 30 percent cobbles, medium acid; clear smooth boundary.

C2—41 to 60 inches; yellowish brown (10YR 5/4) very cobbly loam, dark yellowish brown (10YR 4/4) moist, common yellow (10YR 7/6) mottles; massive; hard, firm, nonsticky and nonplastic; few very fine through coarse roots; few very fine and fine tubular pores; 25 percent pebbles, 30 percent highly weathered andesitic cobbles; slightly acid.

The solum thickness is 15 to 30 inches. Reaction ranges from medium acid to slightly acid throughout the profile. The control section (between depths of 10 inches and 40 inches) is loam or sandy loam that is 8 to 18 percent clay. It is 35 to 60 percent rock fragments.

Singatse Series

The Singatse series consists of very shallow, somewhat excessively drained soils on rounded hill crests and side slopes. These soils formed in residuum

mainly of rhyolite and basalt. The slope is 8 to 30 percent.

Typical pedon of Singatse very gravelly sandy loam, in an area of Singatse-Fireball-Rednik association, 2,000 feet north and 600 feet east of the southwest corner of sec. 22, T. 24 N., R. 24 E.

A1—0 to 2 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; moderate medium platy structure; soft, very friable, slightly sticky and slightly plastic; very few very fine roots; many fine and medium and few coarse vesicular pores; 35 percent pebbles, 3 percent cobbles; slightly effervescent; strongly alkaline; abrupt smooth boundary.

C1—2 to 6 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine vesicular and few fine tubular pores; 40 percent pebbles, 5 percent cobbles, 10 percent stones; slightly effervescent; moderately alkaline; abrupt wavy boundary.

C2r—6 to 12 inches; volcanic saprolite; very hard, extremely firm; few moderately thick clay films in fractures.

R—12 inches; hard vesicular basaltic bedrock.

Depth to the paralithic contact is 4 to 10 inches, and depth to lithic contact is 10 to 20 inches. Reaction throughout the profile is moderately alkaline to strongly alkaline. The control section from the surface to paralithic contact is very gravelly loam or very gravelly sandy loam and is 5 to 15 percent clay. It is 35 to 60 percent gravel.

Skedaddle Series

The Skedaddle series consists of very shallow, well drained soils on mountain slopes. These soils formed in residuum and colluvium derived mainly from basalt. The slopes are 15 to 70 percent.

Typical pedon of Skedaddle very stony loam, in an area of Skedaddle-Pahrange-Lemm association, 300 feet west and 600 feet north of the southeast corner of sec. 26, T. 23 N., R. 22 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine interstitial pores; 20 percent pebbles, 10 percent cobbles, 15 percent stones; mildly alkaline; clear smooth boundary.

A12—2 to 8 inches; light brownish gray (10YR 6/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine to medium roots; common very fine to medium tubular pores; 30 percent pebbles; neutral; abrupt wavy boundary.

Cr—8 to 11 inches; weathered rock with roots and clay loam pockets.

R—11 inches; hard bedrock.

Depth to bedrock ranges from 4 to 12 inches. Reaction throughout the profile is neutral to mildly alkaline. The control section is sandy loam or loam and is 18 to 27 percent clay. It is 35 to 60 percent rock fragments.

Smallcone Series

The Smallcone series consists of very shallow, well drained soils formed in residuum of weathered andesite. These soils are on eroded mountain side slopes and ridges. The slopes are 15 to 50 percent.

Typical pedon of Smallcone very gravelly coarse sandy loam, 15 to 50 percent slopes, in an area of Duco-Smallcone-Cagle association, 113 feet south and 1,146 feet west of the northeast corner of sec. 1, T. 17 N., R. 20 E.

A1—0 to 3 inches; very pale brown (10YR 7/4) very gravelly coarse sandy loam, yellowish brown (10YR 5/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 45 percent pebbles; medium acid; clear smooth boundary.

C—3 to 6 inches; very pale brown (10YR 7/4) extremely gravelly coarse sandy loam, yellowish brown (10YR 5/6) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and medium roots; common very fine and medium interstitial pores; 50 percent pebbles, 10 percent cobbles, 5 percent stones; strongly acid; abrupt wavy boundary.

R—6 inches; weathered andesite with pockets of clay loam and roots in cracks; strongly acid.

Bedrock is at a depth of 4 to 10 inches. Reaction is medium acid or strongly acid throughout the profile.

Texture from the surface to bedrock is sandy loam or coarse sandy loam. The profile is 5 to 15 percent clay and is 35 to 75 percent rock fragments.

Softscrabble Series

The Softscrabble series consists of very deep, well drained soils that formed in colluvium and residuum from volcanic rocks. These soils are on concave hillside slopes. The slopes are 15 to 50 percent.

Typical pedon of Softscrabble very stony loam, in an area of Softscrabble-Gabica-Burnborough association, about 500 feet west and 1,600 feet south of the northeast corner of sec. 14, T. 24 N., R. 20 E.

A11—0 to 1 inch; dark brown (10YR 4/3) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine through coarse roots; many very fine and fine tubular pores; 25 percent pebbles, 5 percent cobbles, 10 percent stones; neutral; clear smooth boundary.

A12—1 inch to 9 inches; dark brown (10YR 3/3) extremely gravelly loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine through coarse roots; many very fine and fine tubular pores; 55 percent pebbles, 5 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

B21t—9 to 19 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; strong fine angular blocky structure; hard, friable, sticky and plastic; common very fine through medium roots; common fine and very fine tubular pores; many moderately thick clay films on ped faces and lining pores; 10 percent pebbles, 20 percent cobbles, 5 percent stones; neutral; gradual wavy boundary.

B22t—19 to 30 inches; brown (10YR 5/3) extremely cobbly clay loam, dark brown (10YR 3/3) moist; strong fine angular blocky structure; hard, friable, sticky and plastic; common very fine through medium roots; common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 5 percent pebbles, 55 percent cobbles, 5 percent stones; neutral; gradual smooth boundary.

IIB23t—30 to 40 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; strong fine angular blocky structure; hard, friable, sticky and plastic; common very fine through medium roots; common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 1 percent pebbles; neutral; clear wavy boundary.

IIB24t—40 to 60 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 3/4) moist; common fine light olive brown (2.5Y 5/6) moist mottles; strong fine angular blocky structure; hard, friable, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 15 percent pebbles; neutral; gradual smooth boundary.

IIIB3t—60 to 78 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; common fine strong brown (7.5Y 5/8) mottles moist; strong fine angular blocky structure; hard, friable, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; many moderately thick clay films on ped faces and in pores; 5 percent pebbles; neutral.

IIIC1r—78 to 89 inches; highly weathered andesite.

The solum thickness is 60 to 80 inches. Reaction throughout the profile is neutral or slightly acid.

The control section averages clay loam. It is 27 to 35 percent clay and is 35 to 70 percent rock fragments.

Spasprey Series

The Spasprey series consists of moderately deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium derived from mixed rock. The slopes are 0 to 8 percent.

Typical pedon of Spasprey sandy loam, 0 to 2 percent slopes, 1,200 feet east and 1,400 feet south of the northwest corner of sec. 1, T. 20 N., R. 20 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium and thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine vesicular pores; neutral; clear smooth boundary.

B2t—2 to 12 inches; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 4/4) moist; weak medium prismatic structure parting to weak medium angular blocky; hard, friable, sticky and plastic; common fine to medium roots; common very fine to medium tubular pores; common thin clay films on ped faces and bridging sand grains and moderately thick clay films in pores; neutral; clear smooth boundary.

C1ca—12 to 29 inches; light brownish gray (10YR 6/2) sandy loam, brown (10YR 4/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine to medium roots; few very fine to medium tubular pores; 10 percent durinodes; few silica-cemented lamellae; strongly effervescent; moderately alkaline; clear irregular boundary.

C2casim—29 to 46 inches; pale brown (10YR 6/3) strongly silica-cemented duripan; extremely hard, brittle; strongly effervescent; moderately alkaline; clear irregular boundary.

C3sica—46 to 60 inches; pale brown (10YR 6/3) weakly silica-cemented sandy loam, brown (10YR 5/3) moist; massive; very hard, brittle, nonsticky and nonplastic; strongly effervescent; moderately alkaline.

The thickness of the solum is 10 to 20 inches. Depth to the strongly silica-cemented duripan is 20 to 30 inches. Reaction ranges from neutral to moderately alkaline throughout the profile. The Bt horizon is light clay loam, sandy clay loam, or heavy loam. It is 20 to 35 percent clay.

Springmeyer Series

The Springmeyer series consists of very deep, well drained soils on terraces. These soils formed in alluvium derived from mixed rock. The slopes are 0 to 4 percent.

Typical pedon of Springmeyer stony loam, 0 to 2 percent slopes, 800 feet west and 2,550 feet south of the northeast corner of sec. 7, T. 19 N., R. 18 E.

Ap1—0 to 2 inches; grayish brown (10YR 5/2) stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky structure parting to weak thin platy; firm, sticky and plastic; many fine and very fine roots; many fine and very fine tubular pores; 5 to 10 percent pebbles, 0.1 percent stones; neutral; clear smooth boundary.

Ap2—2 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and common very fine roots; few fine and common very fine tubular pores; 10 percent pebbles; neutral; clear smooth boundary.

A1—7 to 13 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; friable, slightly sticky and slightly plastic; few fine and very fine roots; few fine and common very fine tubular pores; 10 percent pebbles; neutral; clear wavy boundary.

B1t—13 to 23 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure; firm, slightly sticky and slightly plastic, very few roots; few fine and very fine tubular pores; few moderately thick clay films on ped faces and in pores; 10 percent pebbles; neutral; clear wavy boundary.

B2t—23 to 40 inches; light yellowish brown (10YR 6/4) light sandy clay, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure; very firm, sticky and plastic; very few roots; few fine and very fine pores; common moderately thick clay films on ped faces and in pores; 10 percent pebbles; neutral; clear wavy boundary.

C1—40 to 60 inches; light yellowish brown (10YR 6/4) very cobbly sandy clay loam, yellowish brown (10YR 5/4) moist; massive; friable, sticky and slightly plastic; 25 percent pebbles, 15 percent cobbles; neutral.

Solum thickness ranges from 20 to 60 inches. The mollic epipedon is 10 to 19 inches thick. Reaction throughout the profile is slightly acid to neutral but is moderately alkaline in the C horizon in some pedons.

The texture of the control section averages sandy clay loam, loam, or clay loam. The control section is 25 to 35 percent clay and is 10 to 35 percent rock fragments.

Stingdorn Series

The Stingdorn series consists of shallow, well drained soils that formed in residuum of rhyolite. These soils are on uplands. The slopes are 15 to 30 percent.

Typical pedon of Stingdorn extremely stony loam, in an area of Stingdorn-Singatse-Rock outcrop association, about 2,200 feet north and 2,000 feet west of the southeast corner of sec. 2, T. 24 N., R. 24 E.

A1—0 to 4 inches; pale brown (10YR 6/3) extremely stony loam, brown (10YR 4/3) moist; weak medium and thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine vesicular pores; 45 percent pebbles, 5 percent cobbles, 15 percent stones; moderately alkaline; clear smooth boundary.

B2t—4 to 9 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, very friable, sticky and plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; many thin clay films on ped faces and lining pores; 50 percent pebbles; slightly effervescent; moderately alkaline; clear smooth boundary.

C1sica—9 to 12 inches; very pale brown (10YR 7/3) weakly silica-cemented extremely gravelly sandy loam, pale brown (10YR 6/3) moist; massive; hard, brittle, nonsticky and nonplastic; common very fine and fine roots in pockets; many very fine and fine interstitial pores; 75 percent pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

C2sicam—12 to 12 1/2 inches; white (10YR 8/2) indurated duripan.

R—12 1/2 inches; unweathered rhyolite.

Depth to the indurated duripan over hard bedrock ranges from 8 to 20 inches. Reaction throughout the profile is moderately alkaline or strongly alkaline.

The B2t horizon is clay loam. It is 28 to 35 percent clay and is 35 to 55 percent rock fragments.

Stodick Series

The Stodick series consists of shallow, well drained soils on back slopes of pediments. These soils formed in pedisediments derived from mixed rock. The slopes are 15 to 50 percent.

Typical pedon of Stodick very stony loam, 15 to 30 percent slopes, 350 feet west and 950 feet south of the northeast corner of sec. 29, T. 19 N., R. 19 E.

A1—0 to 4 inches; light brownish gray (10YR 6/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; soft, very friable,

slightly sticky and slightly plastic; many fine and very fine roots; many fine and very fine interstitial pores; 15 percent pebbles, 3 percent stones; neutral; clear smooth boundary.

B1t—4 to 11 inches; light brownish gray (10YR 6/2) very gravelly light clay loam, brown (10YR 4/3) moist; weak medium prismatic structure; slightly hard, friable, sticky and plastic; many fine and very fine roots; common fine tubular pores; common moderately thick clay films on ped faces and common thin clay films in pores; 35 percent pebbles; neutral; clear wavy boundary.

IIB2t—11 to 14 inches; yellowish brown (10YR 5/4) very gravelly heavy clay loam, yellowish brown (10YR 5/4) moist; weak medium prismatic structure; very hard, firm, sticky and plastic; few fine and medium roots; very few pores; few thick clay films; 35 percent pebbles; neutral.

IICr—14 to 60 inches; tuff, highly fractured in the upper part and interbedded with mudstone and sandstone.

The thickness of the solum and the depth to soft bedrock are 14 to 20 inches. Reaction throughout the profile ranges from neutral to slightly acid.

The control section is loam or clay loam and averages 25 to 35 percent clay. It is 35 to 50 percent rock fragments.

Stumble Series

The Stumble series consists of very deep, somewhat excessively drained soils on alluvial fans and terraces. These soils formed in alluvium derived from mixed rock. The slopes are 4 to 15 percent.

Typical pedon of Stumble loamy sand, in an area of Stumble-Ruhe-Bluewing association, 1,400 feet south and 1,200 feet west of the northeast corner of sec. 17, T. 23 N., R. 24 E.

A1—0 to 2 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 10 percent pebbles; moderately alkaline; clear smooth boundary.

C1—2 to 14 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and medium roots; many very fine and fine interstitial pores; 3 percent fine pebbles; strongly alkaline; clear smooth boundary.

C2ca—14 to 24 inches; pale brown (10YR 6/3) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and medium roots; many very fine and fine interstitial pores; 3 percent fine pebbles; strongly effervescent; strongly alkaline; clear smooth boundary.

IIC3ca—24 to 35 inches; light brownish gray (10YR 6/2) gravelly loamy sand, dark brown (10YR 4/3) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 30 percent pebbles; violently effervescent; strongly alkaline; clear smooth boundary.

IIIC4ca—35 to 43 inches; light brownish gray (10YR 6/2) loamy sand, dark brown (10YR 4/3) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; 10 percent fine pebbles; violently effervescent; strongly alkaline; clear smooth boundary.

IVC5ca—43 to 60 inches; stratified gravelly sand and very gravelly sand; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 35 percent pebbles; violently effervescent; strongly alkaline.

The profile is more than 60 inches. Reaction throughout the profile ranges from mildly alkaline to strongly alkaline. Depth to free carbonates ranges from 10 to 22 inches. The control section is stratified and has an average texture of loamy sand or loamy fine sand. It is 3 to 10 percent clay and is 0 to 35 percent pebbles.

Sumine Series

The Sumine series consists of moderately deep, well drained soils on mountain slopes. These soils formed in mixed colluvium and residuum. The slope is 30 to 50 percent.

Typical pedon of Sumine very stony loam, in an area of Softscrabble-Gabica-Sumine association, 450 feet east and 2,400 feet south of the northwest corner of sec. 36, T. 21 N., R. 22 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; 15 percent pebbles, 15 percent cobbles, 15 percent stones; neutral; clear smooth boundary.

A12—4 to 6 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 10 percent pebbles, 15 percent cobbles, 15 percent stones; neutral; clear wavy boundary.

B21t—6 to 13 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate and strong fine and medium angular blocky structure; hard, friable, sticky and plastic; many very fine, fine, and medium roots; common very fine and fine tubular pores; common thin clay films on peds and in pores; 20 percent pebbles, 20 percent cobbles; neutral; clear wavy boundary.

B22t—13 to 29 inches; pale brown (10YR 6/3) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium angular blocky structure; very hard, very friable, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; common thin and moderately thick clay films on peds and in pores and coating coarse fragments; 35 percent pebbles, 10 percent cobbles; neutral; clear irregular boundary.

B3t—29 to 34 inches; brown (7.5YR 5/4) extremely cobbly loam, dark brown (7.5YR 4/4) moist; massive; very hard, friable, sticky and plastic; few very fine roots; very few very fine tubular pores; common moderately thick clay films on coarse fragments; 20 percent pebbles, 30 percent cobbles, 10 percent stones; neutral; gradual broken boundary.

R—34 inches; hard fractured basaltic bedrock.

Thickness of the solum and depth to hard bedrock range from 20 to 40 inches. The mollic epipedon is 8 to 15 inches thick and includes the upper part of the B2t horizon. The control section is clay loam or loam and is 25 to 35 percent clay. It is 35 to 60 percent rock fragments.

Surgem Series

The Surgem series consists of moderately deep, well drained soils on uplands. These soils formed in residuum mainly of granodiorite. The slope is 8 to 50 percent.

Typical pedon of Surgem stony sandy loam, 8 to 15 percent slopes, 1,000 feet west and 1,700 feet south of the northeast corner of sec. 8, T. 20 N., R. 20 E.

Pebbles cover about 25 percent of the surface; cobbles, 1 percent; and stones, 2 percent. The surface is about 1 percent granodiorite rock outcrop.

A11—0 to 2 inches; grayish brown (10YR 5/2) stony sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 60 percent pebbles, 2 percent stones; slightly acid; abrupt wavy boundary.

A12—2 to 4 inches; pale brown (10YR 6/3) gravelly loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine vesicular pores; 35 percent pebbles; slightly acid; abrupt wavy boundary.

B1t—4 to 10 inches; brown (10YR 5/3) very cobbly clay loam, dark yellowish brown (10YR 3/4) moist; weak very fine subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine roots; few very fine tubular pores; few thin clay films on ped faces and in pores; 25 percent pebbles, 25 percent cobbles; neutral; clear irregular boundary.

B2t—10 to 24 inches; brown (7.5YR 5/4) very cobbly clay, dark brown (7.5YR 4/4) moist; strong medium angular and subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine and fine roots; few very fine tubular pores; 60 percent cobbles; neutral; abrupt irregular boundary.

R—24 to 30 inches; fractured granodiorite bedrock with clay in the fractures.

Solum thickness and depth to bedrock are 20 to 30 inches. Reaction ranges from slightly acid to mildly alkaline throughout the profile. The B2t horizon is clay or sandy clay. It is 35 to 50 percent clay and is 50 to 60 percent rock fragments.

Surprise Series

The Surprise series consists of very deep, well drained soils on alluvial fans. These soils formed in alluvium derived from mixed rock. The slopes are 2 to 8 percent.

Typical pedon of Surprise loamy sand, 2 to 4 percent slopes, 2,400 feet west and 1,200 feet north of the southeast corner of sec. 17, T. 16 N., R. 20 E.

Ap—0 to 8 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many fine and very fine tubular pores; slightly acid; clear smooth boundary.

A11—8 to 14 inches; brown (10YR 5/3) light sandy loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine pores; slightly acid; clear smooth boundary.

B2—14 to 26 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; very few roots; very few pores; 20 percent fine pebbles; slightly acid; gradual smooth boundary.

C1—26 to 37 inches; light yellowish brown (10YR 6/4) gravelly light sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; very few roots; very few pores; 20 percent fine pebbles; slightly acid; gradual smooth boundary.

C2—37 to 66 inches; light yellowish brown (10YR 6/4) stratified gravelly loamy sand and sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 15 percent pebbles; slightly acid.

Depth of the solum ranges from 23 to 28 inches. The mollic epipedon is 10 to 14 inches thick. Reaction throughout the profile ranges from slightly acid to neutral.

The control section has average texture of sandy loam or loam. It is 10 to 18 percent clay. It is 15 to 35 percent rock fragments.

Sutcliff Series

The Sutcliff series consists of deep, well drained soils that formed in alluvium from mixed rock. These soils are on alluvial fans. The slope is 4 to 15 percent.

Typical pedon of Sutcliff very stony loam, in an area of Sutcliff-Kleinbush-Washoe association, about 400 feet east and 25 feet north of the southwest corner of sec. 19, T. 22 N., R. 25 E.

A11—0 to 2 inches; brown (10YR 5/3) very stony loam, pale brown (10YR 4/3) moist; moderate medium subangular blocky structure parting to weak thin platy; soft, very friable, sticky and plastic; common very fine and fine roots; few very fine and fine tubular pores; 30 percent pebbles, 20 percent cobbles, 10 percent stones; moderately alkaline; clear smooth boundary.

A12—2 to 5 inches; brown (10YR 5/3) very stony loam, pale brown (10YR 4/3) moist; weak thin and medium platy structure; slightly hard, very friable, sticky and plastic; many very fine and fine roots; few very fine and fine tubular pores; 30 percent pebbles, 20 percent cobbles, 10 percent stones; effervescent; moderately alkaline; clear smooth boundary.

B21t—5 to 15 inches; light yellowish brown (10YR 6/4) very cobbly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium angular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; few very fine and fine tubular pores; common thin and few moderately thick clay films on the faces of peds and lining pores; 5 percent pebbles, 20 percent cobbles, 10 percent stones; effervescent; moderately alkaline; clear wavy boundary.

B22tca—15 to 25 inches; light brown (7.5YR 6/4) very stony clay loam, brown (7.5YR 4/4) moist; strong medium angular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; many very fine and fine tubular pores; common moderately thick clay films on faces of peds and lining pores; 10 percent pebbles, 10 percent cobbles, 20 percent stones; violently effervescent with lime coatings on underside of rock fragments; strongly alkaline; clear irregular boundary.

C1ca—25 to 42 inches; pinkish gray (7.5YR 6/2) very cobbly loam, brown (7.5YR 4/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; 20 percent pebbles, 20 percent cobbles, 5 percent stones; violently effervescent; strongly alkaline; abrupt wavy boundary.

C2sicam—42 to 53 inches; white (10YR 8/2) strongly silica-cemented hardpan; violently effervescent with lime in seams.

Thickness of the solum ranges from 20 to 40 inches. Depth to the strongly cemented duripan is 40 to 60 inches. Reaction throughout the profile is moderately alkaline or strongly alkaline.

The Bt horizon is clay loam that is 28 to 35 percent clay. It is 35 to 50 percent rock fragments.

Tallac Series

The Tallac series consists of deep, well drained soils on uplands. These soils formed in glacial deposits derived from mixed rock. The slope is 4 to 50 percent.

Typical pedon of Tallac very bouldery sandy loam, 4 to 30 percent slopes, 2,200 feet east and 100 feet north of the southwest corner of sec. 3, T. 17 N., R. 18 E.

O1—1 inch to 0; pine litter duff.

A11—0 to 6 inches; dark grayish brown (10YR 4/2) very bouldery sandy loam, very dark brown (10YR 2/2) moist; weak to moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine through coarse roots; many very fine through medium tubular and interstitial pores; 5 percent pebbles, 5 percent cobbles, 10 percent stones, 5 percent boulders; medium acid; clear smooth boundary.

A12—6 to 13 inches; brown (10YR 5/3) very bouldery sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine through coarse roots; many very fine through medium tubular and interstitial pores; 5 percent pebbles, 5 percent cobbles, 20 percent stones, 10 percent boulders; medium acid; clear wavy boundary.

A13—13 to 26 inches; brown (10YR 4/3) extremely bouldery sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine through medium roots; many very fine and fine tubular pores; 10 percent durinodes, 5 percent pebbles, 5 percent cobbles, 25 percent stones, 20 percent boulders; medium acid; clear wavy boundary.

C1—26 to 45 inches; light yellowish brown (10YR 6/4) very stony sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine through medium roots; common very fine and fine tubular and interstitial pores; 5 percent pebbles, 5 percent cobbles, 30 percent stones, 10 percent boulders; slightly acid; clear wavy boundary.
C2si—45 to 50 inches; dark brown (10YR 4/3) very bouldery loamy sand, dark brown (10YR 4/3) moist; massive; hard, firm nonsticky and nonplastic; few very fine and fine roots; few very fine and fine tubular and interstitial pores; 5 percent pebbles, 5 percent cobbles, 30 percent stones, 20 percent boulders; slightly acid.

Depth of the soil profile is more than 50 inches. Depth to the Csi horizon is 40 to 60 inches. The umbric epipedon is 20 to 35 inches thick. Reaction throughout the profile is medium acid or slightly acid. The control section is coarse sandy loam, sandy loam, or loam. It is 5 to 15 percent clay and is 35 to 65 percent rock fragments.

Tanob Series

The Tanob series consists of moderately deep, well drained soils on uplands. These soils formed in residuum mainly of acid igneous rocks. Slopes are 8 to 30 percent.

Typical pedon of Tanob gravelly loamy coarse sand, in an area of Haypress-Tanob-Rock outcrop complex, 15 to 50 percent slopes, 700 feet west and 700 feet south of the northeast corner of sec. 20, T. 23 N., R. 18 E.

A11—0 to 2 inches; light brownish gray (10YR 6/2) gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; common very fine roots; many very fine and fine interstitial pores; 20 percent fine pebbles; strongly acid; abrupt smooth boundary.
A12—2 to 17 inches; dark grayish brown (10YR 4/2) loamy coarse sand, very dark grayish brown (10YR 3/2) moist; soft, very friable, nonsticky and nonplastic; many very fine through medium roots; many very fine through medium tubular pores; 10 percent fine pebbles; medium acid; clear smooth boundary.
B1t—17 to 22 inches; yellowish brown (10YR 5/4) heavy loamy coarse sand, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, nonsticky and nonplastic; many very fine and medium roots; many very fine and fine tubular pores; 10 percent fine pebbles; few thin clay films bridging sand grains and in pores; medium acid; clear smooth boundary.
B2t—22 to 28 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine tubular pores; 5 percent pebbles; common moderately thick clay films bridging sand grains and in pores; slightly acid; clear smooth boundary.
C1r—28 to 32 inches; weathered granodiorite.

The thickness of the solum and the depth to weathered bedrock range from 20 to 40 inches. Reaction ranges from slightly acid to strongly acid throughout the profile. The B2t horizon is sandy loam that is 8 to 18 percent clay. It averages 5 to 15 percent coarse fragments, mostly in the form of fine pebbles.

Temo Series

The Temo series consists of shallow, excessively drained soils on uplands. These soils formed in residuum mainly of acid igneous rocks. Slopes are 30 to 50 percent.

Typical pedon of Temo bouldery coarse sand in an area of Temo-Witefels-Rock outcrop association, 2,000 feet east and 1,700 feet south of the northwest corner of sec. 30, T. 16 N., R. 19 E.

O1—0.5 inch to 0; pine and fir litter duff.
A11—0 to 2 inches; grayish brown (10YR 5/2) bouldery coarse sand, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; many fine and very fine interstitial pores; 25 percent fine pebbles, 1 percent boulders; medium acid; clear wavy boundary.
A12—2 to 10 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots and few medium and coarse roots; many fine and very fine interstitial pores; 25 percent fine pebbles; slightly acid; abrupt wavy boundary.
C1—10 to 16 inches; pale brown (10YR 6/3) gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine to coarse roots; many very fine and fine interstitial pores; 35 percent pebbles; medium acid; clear wavy boundary.
C2r—16 to 35 inches; granitic gruss.

Depth to the granitic gruss ranges from 8 to 20 inches. Reaction ranges from slightly acid to medium acid throughout the profile. The control section is loamy coarse sand or coarse sand. It is 2 to 8 percent clay and is 10 to 35 percent pebbles.

Thulepah Series

The Thulepah series consists of very deep, well drained soils that formed in residuum and colluvium from

volcanic rocks. These soils are on eroded hilltops and plateaus. Slopes are 8 to 30 percent.

Typical pedon of Thulepah very stony loam, in an area of Thulepah-Mosquet association, 2,200 feet south and 1,500 feet east of the northwest corner of sec. 3, T. 24 N., R. 20 E.

A11—0 to 2 inches; dark brown (7.5YR 3/2) very stony loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; common very fine, fine, and medium roots; common very fine and fine tubular and interstitial pores; 30 percent pebbles, 15 percent stones; neutral; abrupt smooth boundary.

A12—2 to 6 inches; dark grayish brown (10YR 4/2) cobbly loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; many very fine through coarse roots; common very fine and fine tubular and interstitial pores; 10 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

IIB21t—6 to 13 inches; dark brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common very fine through coarse roots; common very fine and fine tubular pores; common moderately thick clay films on ped faces, lining pores, and coating coarse fragments; 10 percent pebbles; neutral; clear smooth boundary.

IIB22t—13 to 22 inches; dark brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few roots; few tubular pores; few thin clay films on ped faces and lining pores; 25 percent pebbles; neutral; clear smooth boundary.

IIB23t—22 to 28 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 3/4) moist; brownish yellow (10YR 6/8) and olive yellow (2.5Y 6/6) mottles; moderate fine subangular blocky structure; hard, friable, sticky and plastic; few medium roots; common fine tubular pores; common moderately thick clay films on ped faces and in pores; 40 percent pebbles; neutral; clear smooth boundary.

IIIB24t—28 to 37 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 3/4) moist; brownish yellow (10YR 6/8) and olive yellow (2.5Y 6/6) mottles; moderate fine subangular blocky structure; hard, friable, sticky and plastic; few roots; common fine tubular pores; common moderately thick clay films on ped faces and in pores; 25 percent pebbles; neutral; clear smooth boundary.

IIIB31t—37 to 50 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; brownish yellow (10YR 6/8) and light olive brown (2.5Y 5/6) mottles; moderate fine subangular blocky structure; hard, friable, sticky and plastic; few roots; few pores; common moderately thick clay films on ped faces and lining pores; neutral; clear smooth boundary.

IIIB32t—50 to 62 inches; yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 3/4) moist; brownish yellow (10YR 6/3) and light olive green (2.5Y 5/6) mottles; weak fine subangular blocky structure; hard, friable, sticky and plastic; few roots; few fine tubular pores; few thin clay films on ped faces and lining pores; slightly acid.

The solum is more than 60 inches thick. Reaction ranges from slightly acid to neutral throughout the profile. The B2t horizon is clay loam, silty clay loam, or loam. It is 27 to 35 percent clay and is 5 to 35 percent rock fragments.

Ticino Series

The Ticino series consists of moderately deep, well drained soils on hillsides. These soils formed in residuum and colluvium from mixed but predominantly metasedimentary rocks, rhyolite, and andesite. Slopes are 4 to 30 percent.

Typical pedon of Ticino gravelly fine sandy loam, in an area of Burnborough-Ticino-Softscrabble association, 1,400 feet east and 400 feet north of the southwest corner of sec. 24, T. 20 N., R. 18 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) gravelly fine sandy loam, very dark gray (10YR 3/1) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; many fine and very fine interstitial and tubular pores; 20 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

A12—4 to 11 inches; dark brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 15 percent pebbles; neutral; clear smooth boundary.

B21t—11 to 17 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine through coarse roots; many very fine and fine tubular pores; common thin clay films coating ped faces and pores; 15 percent pebbles; neutral; clear smooth boundary.

B22t—17 to 22 inches; yellowish brown (10YR 5/4) gravelly loam, dark brown (10YR 4/3) moist; massive; hard, friable, sticky and plastic; few fine

and very fine and common medium and coarse roots; many very fine and fine and few medium tubular pores; common thin clay films coating ped faces and pores; 20 percent pebbles, 5 percent cobbles; neutral; clear smooth boundary.

Cr—22 to 50 inches; highly weathered metasedimentary rock with some roots and clay films in fractures.

The thickness of the solum and the depth to paralithic contact range from 20 to 40 inches. Reaction ranges from neutral to slightly acid throughout the profile. The B2t horizon is loam or clay loam. It is 18 to 35 percent clay and is 15 to 35 percent coarse fragments.

Toiyabe Series

The Toiyabe series consists of shallow, excessively drained soils on uplands. These soils formed in residuum mainly of granodiorite. Slopes are 15 to 70 percent.

Typical pedon of Toiyabe bouldery coarse sand, in an area of Toiyabe-Corbett-Rock outcrop association, moderately steep, 2,200 feet east and 600 feet north of the southwest corner of sec. 20, T. 16 N., R. 19 E.

A11—0 to 3 inches; dark grayish brown (10YR 4/2) bouldery coarse sand, very dark brown (10YR 2/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 5 percent fine pebbles, 2 percent boulders; neutral; clear smooth boundary.

A12—3 to 8 inches; dark grayish brown (10YR 4/2) gravelly loamy coarse sand, very dark brown (10YR 2/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 15 percent fine pebbles; neutral; clear wavy boundary.

AC—8 to 13 inches; pale brown (10YR 6/3) gravelly coarse sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine to medium roots; many very fine and fine interstitial pores; 10 percent fine pebbles; neutral; clear irregular boundary.

Cr—13 to 29 inches; weathered granodiorite.

The depth to weathered bedrock ranges from 10 to 20 inches. Reaction throughout the profile ranges from medium acid to neutral. The control section is loamy coarse sand, sand, coarse sand, or very coarse sand. It is 0 to 4 percent clay and is 5 to 35 percent rock fragments, mostly fine gravel.

Toulon Series

The Toulon series consists of very deep, excessively drained soils on relict shoreline terraces and beaches. These soils formed in alluvium from mixed rock sources. Slopes are 2 to 8 percent.

Typical pedon of Toulon very gravelly loam, in an area of Isolde-Toulon complex, 0 to 15 percent slopes, 400 feet west and 2,600 feet north of the southeast corner of sec. 25, T. 24 N., R. 23 E.

A11—0 to 1 inch; pale brown (10YR 6/3) gravelly loamy sand, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; very few fine roots; many very fine and fine interstitial and few fine tubular pores; 30 percent pebbles; slightly effervescent; moderately alkaline; clear smooth boundary.

A12—1 to 6 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) moist; moderate medium and thick platy structure parting to weak fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many medium and coarse vesicular and interstitial pores; 40 percent pebbles; strongly effervescent; strongly alkaline; clear smooth boundary.

B2—6 to 13 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; common fine strong brown (7.5YR 5/8) stains; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and medium roots; common very fine and fine tubular pores; 40 percent pebbles; slightly effervescent; strongly alkaline; clear smooth boundary.

C1ca—13 to 60 inches; gray (10YR 6/1) stratified very gravelly loamy sand and very gravelly coarse sand; gray (10YR 5/1) moist; single grained; loose, nonsticky, nonplastic; 40 percent pebbles, 15 percent cobbles; strongly effervescent; thick lime coats on bottom of rock fragments; moderately alkaline.

The solum ranges from 13 to 20 inches in thickness. Reaction throughout the profile is moderately alkaline or strongly alkaline. The control section averages loamy sand or coarse sand. It is 0 to 15 percent clay and is 40 to 60 percent rock fragments.

Tristan Series

The Tristan series consists of deep, well drained soils that formed in residuum and colluvium from basalt. Tristan soils are on convex mountain slopes. Slopes are 15 to 50 percent.

Typical pedon of Tristan very stony loam, in an area of McQuarrie-Tristan-Arzo association, 900 feet east and 1,800 feet south of the northwest corner of sec. 35, T. 22 N., R. 22 E.

A11—0 to 3 inches; brown (7.5YR 4/2) very stony loam, dark brown (7.5YR 3/2) moist; moderate thick platy structure parting to moderate fine subangular blocky; soft, very friable, slightly sticky and slightly plastic; common very fine roots; few medium tubular and many fine and very fine interstitial pores; 20 percent pebbles, 15 percent cobbles, 10 percent stones; mildly alkaline; gradual smooth boundary.

A12—3 to 7 inches; brown (7.5YR 4/2) very stony loam, dark brown (7.5YR 3/2) moist; moderate medium to fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine and very fine tubular pores; 20 percent pebbles, 10 percent cobbles, 15 percent stones; neutral; clear smooth boundary.

B1t—7 to 11 inches; brown (7.5YR 4/2) very gravelly loam, dark brown (7.5YR 3/2) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; common fine through coarse roots; common fine tubular pores; many thin clay films on peds and in pores; 30 percent pebbles, 10 percent cobbles; neutral; gradual wavy boundary.

B21t—11 to 17 inches; brown (7.5YR 5/2) very stony clay loam, dark brown (7.5YR 3/2) moist; strong medium and coarse subangular blocky structure; very hard, firm, sticky and plastic; common fine and medium roots; common fine tubular pores; many moderately thick clay films on peds and in pores; 10 percent pebbles, 15 percent cobbles, 20 percent stones; neutral; clear wavy boundary.

B22t—17 to 28 inches; brown (7.5YR 5/4) very gravelly clay loam, brown (7.5YR 4/4) moist; strong medium and coarse angular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; common fine and very fine tubular pores; many thin and moderately thick clay films on peds and in pores; 30 percent pebbles, 5 percent cobbles, 5 percent stones; neutral; clear wavy boundary.

B3t—28 to 49 inches; brown (7.5YR 5/4) extremely cobbly sandy clay loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; many very fine through medium roots; common very fine and fine tubular pores; many thin and moderately thick clay films in pores and on mineral grains; 20 percent pebbles, 40 percent cobbles, 20 percent stones; neutral; gradual wavy boundary.

R—49 inches; highly fractured basaltic bedrock; soil and roots extend into the fractures.

Thickness of the solum and depth to bedrock range from 40 to 60 inches. The reaction throughout the profile is neutral or mildly alkaline.

The upper 20 inches of the Bt horizon is loam or clay loam. It is 18 to 35 percent clay and 35 to 60 percent rock fragments.

Trocken Series

The Trocken series consists of very deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium from mixed rock sources. Slopes are 4 to 30 percent.

Typical pedon of Trocken very stony sandy loam, in an area of Trocken-Stumble-Bluewing association, 1,000 feet north and 1,200 feet east of the southwest corner of sec. 18, T. 24 N., R. 23 E.

A11—0 to 1 inch; brown (10YR 5/3) very stony sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 20 percent pebbles, 3 percent cobbles, 3 percent stones; slightly effervescent; moderately alkaline; clear smooth boundary.

A12—1 to 3 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine, fine, and medium interstitial pores; 15 percent pebbles; slightly effervescent; very strongly alkaline; clear smooth boundary.

B2—3 to 7 inches; brown (10YR 5/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few medium and common very fine and fine roots; common very fine and fine tubular pores; 15 percent pebbles, 5 percent cobbles; effervescent; very strongly alkaline; clear wavy boundary.

C1ca—7 to 11 inches; brown (10YR 5/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; 15 percent pebbles, 5 percent cobbles; moderately thick lime coatings on undersides of pebbles and cobbles; violently effervescent; very strongly alkaline; clear wavy boundary.

C2ca—11 to 19 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine and fine roots; few very fine and fine tubular pores; 30 percent pebbles, 5 percent cobbles; moderately thick lime coatings on undersides of pebbles and cobbles; strongly effervescent; very strongly alkaline; clear wavy boundary.

IIC3—19 to 24 inches; grayish brown (10YR 5/2) very gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; very few very fine and fine tubular and many very fine and fine interstitial pores; 50 percent pebbles, 10 percent cobbles; lime occurs in few

filaments and is moderately thick on undersides of pebbles and cobbles; effervescent; very strongly alkaline; abrupt wavy boundary.

IIIC4—24 to 33 inches; brown (10YR 5/3) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; very few roots; very few tubular and interstitial pores; 45 percent pebbles, 15 percent cobbles, 5 percent stones; effervescent; very strongly alkaline; clear smooth boundary.

IVC5—33 to 40 inches; brown (10YR 5/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and nonplastic; 15 percent pebbles, 5 percent cobbles; slightly effervescent; very strongly alkaline; clear smooth boundary.

VC6—40 to 52 inches; brown (10YR 5/3) extremely cobbly sandy loam, brown (10YR 4/3) moist; massive; hard, very friable, nonsticky and nonplastic; 35 percent pebbles, 35 percent cobbles, 5 percent stones; slightly effervescent; strongly alkaline.

The solum thickness is 5 to 10 inches. Reaction ranges from neutral to very strongly alkaline throughout the profile.

The control section (between depths of 10 inches and 40 inches) averages sandy loam or loam. It is 8 to 18 percent clay. When mixed, it is 35 to 70 percent rock fragments.

Trosi Series

The Trosi series consists of shallow, well drained soils on terraces and alluvial fans. These soils formed in alluvium derived from mixed but predominantly basic volcanic rock. Slopes are 4 to 8 percent.

Typical pedon of Trosi very stony sandy loam, in an area of Barnard-Trosi association, 660 feet west and 760 feet south of the northeast corner of sec. 31, T. 21 N., R. 18 E.

A11—0 to 1 inch; light brownish gray (10YR 6/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; 40 percent pebbles, 5 percent stones; neutral; clear smooth boundary.

A12—1 to 7 inches; light brownish gray (10YR 6/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; 20 percent pebbles; neutral; clear smooth boundary.

A13—7 to 12 inches; pale brown (10YR 6/3) very gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; hard, very friable, sticky and plastic; few very fine to medium roots; common very fine and fine tubular pores; 25 percent pebbles, 10 percent cobbles; slightly acid; gradual smooth boundary.

B2t—12 to 19 inches; brown (10YR 5/3) very cobbly heavy clay loam, dark brown (10YR 4/3) moist; massive; very hard, firm, sticky and plastic; few very fine through coarse roots; common very fine and fine tubular pores; 20 percent pebbles, 15 percent cobbles, 1 percent stones; common thin and moderately thick clay films in pores and bridging sand grains; slightly acid; abrupt smooth boundary.

IIC1sim—19 to 34 inches; indurated hardpan.

IIC2—34 to 60 inches; stratified, consolidated sedimentary deposits.

The thickness of the solum and depth to the strongly silica-cemented hardpan range from 12 to 20 inches. Reaction throughout the profile is slightly acid or neutral. The Bt horizon is heavy clay loam or clay. It is 35 to 50 percent clay and 35 to 50 percent rock fragments.

Truckee Series

The Truckee series consists of very deep, somewhat poorly drained and poorly drained soils on flood plains. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Truckee silt loam, 75 feet east and 625 feet south of the northwest corner of sec. 21, T. 19 N., R. 20 E.

O1—3 inches to 0; dark grayish brown (10YR 4/2) sod, dark brown (10YR 3/3) moist; very strongly calcareous; abrupt wavy boundary.

A11—0 to 3 inches; gray (10YR 5/1) loam, black (10YR 2/1) moist; massive; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine tubular pores; very strongly calcareous; moderately alkaline; clear smooth boundary.

A12—3 to 12 inches; grayish brown (10YR 5/2) heavy silt loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many fine tubular pores; very strongly calcareous; moderately alkaline; abrupt smooth boundary.

C1—12 to 15 inches; light brownish gray (10YR 6/2) heavy silt loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable to firm, slightly sticky and plastic; roots and pores same as in the A12 horizon; very strongly calcareous; moderately alkaline; abrupt smooth boundary.

IIA13b—15 to 18 inches; gray (10YR 5/1) heavy silt loam, very dark brown (10YR 2/2) moist; massive; hard, friable to firm, slightly sticky and plastic; roots and pores same as in the C1 horizon; very strongly

calcareous; moderately alkaline; clear smooth boundary.

IIC2—18 to 22 inches; light gray (10YR 6/1) clay loam, very dark grayish brown (10YR 3/2) moist; many coarse faint very dark brown (10YR 2/2) organic stains and few fine faint dark yellowish brown (10YR 4/4) iron mottles; massive; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; strongly calcareous; strongly alkaline; clear smooth boundary.

IIC3—22 to 27 inches; light brownish gray (10YR 6/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; few fine faint dark yellowish brown (10YR 4/4) iron mottles; massive; slightly hard, friable, slightly sticky and nonplastic; very few very fine roots; many very fine tubular pores; moderately calcareous; moderately alkaline; clear smooth boundary.

IIC4—27 to 31 inches; stratified light gray (10YR 6/1) and gray (10YR 5/1) fine sandy loam, very dark grayish brown (10YR 3/2) and very dark brown (10YR 2/2) moist; very few fine distinct white (10YR 8/2) lime mottles; massive; slightly hard, very friable, slightly sticky and nonplastic; very few very fine roots; common very fine tubular pores; moderately calcareous; moderately alkaline; abrupt smooth boundary.

IIIA14b—31 to 60 inches; gray (10YR 5/1) clay loam, black (10YR 2/1) moist; weak fine angular blocky structure; hard, friable to firm, sticky and plastic; no roots apparent; common very fine tubular pores; moderately calcareous; moderately alkaline.

The soil profile is deeper than 60 inches. Reaction ranges from moderately alkaline to very strongly alkaline.

The control section (between depths of 10 inches and 40 inches) is stratified loam, clay loam, silt loam, or fine sandy loam. It is 20 to 35 percent clay.

Iron mottling is common in the profile. Some pedons are gleyed below 36 inches.

Turria Series

The Turria series consists of very deep, well drained soils on alluvial fans and low terraces. These soils formed in alluvium from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Turria loam, 1,000 feet north and 1,000 feet east of the southwest corner of sec. 11, T. 22 N., R. 19 E.

A1—0 to 2 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; moderate thick platy structure; soft, very friable, slightly sticky and nonplastic; few very fine roots; many very fine and fine vesicular and common very fine interstitial pores; neutral; abrupt smooth boundary.

B1t—2 to 5 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine and fine roots; many very fine interstitial and common very fine vesicular and tubular pores; many thin clay films on ped faces and in pores; neutral; abrupt smooth boundary.

B2t—5 to 8 inches; pale brown (10YR 6/3) crushed clay loam, dark brown (10YR 3/3) moist; moderate fine prismatic structure parting to moderate medium subangular blocky; hard, very friable, sticky and plastic; common very fine and fine roots; common very fine tubular pores; common moderately thick and common thin clay films on ped faces and in pores; neutral; clear smooth boundary.

B3t—8 to 12 inches; pale brown (10YR 6/3) crushed loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and slightly plastic; few very fine and fine roots; few very fine interstitial and common very fine tubular pores; common thin clay films on ped faces and in pores; neutral; clear smooth boundary.

C1—12 to 25 inches; pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine interstitial pores; 15 percent weakly silica-cemented durinodes; neutral; gradual smooth boundary.

IIC2—25 to 45 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 3/3) moist; massive; very hard, friable, slightly sticky and nonplastic; very few roots; few very fine interstitial pores; 15 percent weakly silica-cemented durinodes; slightly effervescent; mildly alkaline; clear wavy boundary.

IIC3—45 to 67 inches; pale brown (10YR 6/3) stratified gravelly sandy loam and gravelly loamy sand, dark brown (10YR 3/3) moist; massive; loose, nonsticky and nonplastic; very few roots; many very fine and fine interstitial pores; 20 percent pebbles; mildly alkaline.

Solum thickness is 12 to 20 inches. Reaction throughout the profile is slightly acid to mildly alkaline. The B2t horizon is loam or clay loam and is 25 to 35 percent clay.

Updike Series

The Updike series consists of very deep, moderately well drained soils on low-lying, concave lake terraces. These soils formed in valley fill material from mixed but predominantly granodiorite sources. Slopes are 0 to 2 percent.

Typical pedon of Updike loam, 2,200 feet east and 1,400 feet north of the southwest corner of sec. 23, T. 21 N., R. 19 E.

A1—0 to 2 inches; light gray (10YR 7/2) loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; many very fine and fine tubular and vesicular pores; strongly effervescent; moderately alkaline; abrupt wavy boundary.

B21t—2 to 6 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; strong fine and medium subangular blocky structure; very hard, firm, very sticky and very plastic; few very fine and fine roots; common very fine tubular pores; many thin clay films on ped faces and in pores; finely segregated lime; strongly effervescent; very strongly alkaline; clear smooth boundary.

B22t—6 to 11 inches; light gray (10YR 7/2) clay, brown (10YR 5/3) moist; strong fine and medium prismatic structure; very hard, firm, very sticky and very plastic; few fine and medium roots; common very fine tubular pores; many moderately thick clay films on ped faces and in pores; segregated lime; strongly effervescent; very strongly alkaline; clear smooth boundary.

B3—11 to 20 inches; pale brown (10YR 6/3) clay, brown (10YR 5/3) moist; weak medium prismatic structure; very hard, firm, very sticky and very plastic; common few fine roots; common very fine tubular pores; many thin clay films in pores and bridges; violently effervescent; very strongly alkaline; clear wavy boundary.

C1—20 to 36 inches; pale brown (10YR 6/3) clay, brown (10YR 5/3) moist; few thin strata of light brownish gray (2.5Y 6/2); strong fine prismatic structure; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; violently effervescent; very strongly alkaline; clear wavy boundary.

IIC2—36 to 47 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; pockets of light yellowish brown (10YR 6/4) sand, yellowish brown (10YR 5/4) moist; massive; hard, friable, sticky and plastic; common very fine tubular pores; violently effervescent; very strongly alkaline; abrupt wavy boundary.

IIIC3—47 to 63 inches; pale brown (10YR 6/3) clay, brown (10YR 5/3) moist; moderate fine prismatic structure; hard, firm, very sticky and very plastic; common very fine tubular pores; violently effervescent; very strongly alkaline.

Solum thickness is 15 to 30 inches. Reaction ranges from moderately alkaline to very strongly alkaline. The B2t horizon is clay or sandy clay. It is 35 to 50 percent clay. The IIC2 and IIIC3 horizons range from very gravelly sand to clay.

Vamp Series

The Vamp series consists of moderately deep, somewhat poorly drained soils on flood plains and low terraces. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Vamp silt loam, strongly saline-alkali, 2,590 feet east and 250 feet north of the southwest corner of sec. 29, T. 19 N., R. 20 E.

A1—0 to 3 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; slightly hard, friable, nonsticky and nonplastic; common very fine to medium roots; common fine and very fine tubular and many very fine interstitial pores; moderately alkaline; clear smooth boundary.

C1—3 to 10 inches; light brownish gray (10YR 6/2) fine sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; common fine and very fine tubular pores; slightly effervescent; very strongly alkaline; clear smooth boundary.

IIA1b—10 to 15 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; strongly effervescent; very strongly alkaline; clear smooth boundary.

IIC2—15 to 30 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; common fine and very fine roots; common fine and very fine tubular pores; slightly effervescent; very strongly alkaline; clear smooth boundary.

IIC3—30 to 36 inches; light brownish gray (10YR 6/2) loam, brown (10YR 4/3) moist; common fine distinct dark grayish brown (2.5Y 4/2) mottles; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular and many very fine interstitial pores; strongly effervescent; strongly alkaline; abrupt smooth boundary.

IIC4sicam—36 to 42 inches; light brownish gray (10YR 6/2), strongly silica-cemented duripan, dark grayish brown (2.5Y 4/2) moist; massive; very hard, extremely firm; strongly effervescent; strongly alkaline; clear smooth boundary.

IIC5—42 to 60 inches; yellowish brown (10YR 5/4) and light olive gray (5Y 6/2) stratified loam, sandy loam, and loamy sand, dark yellowish brown (10YR 4/4) and olive gray (5Y 4/2) moist; massive; slightly sticky and slightly plastic; strongly alkaline.

The depth to the strongly silica-cemented duripan ranges from 20 to 40 inches. Reaction ranges from moderately alkaline to very strongly alkaline throughout

the profile. The control section is silt loam, fine sandy loam, very fine sandy loam, and loam. It is 12 to 18 percent clay.

Verdico Series

The Verdico series consists of moderately deep, well drained soils on strath terraces and pediments. These soils formed in residuum mainly of lacustrine sedimentary rock. Slopes are 4 to 30 percent.

Typical pedon of Verdico extremely stony sandy loam, 15 to 30 percent slopes, 200 feet east and 2,200 feet north of the southwest corner of sec. 27, T. 19 N., R. 19 E.

A1—0 to 2 inches; pale brown (10YR 6/3) extremely stony sandy loam, brown (10YR 4/3) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; few fine pores; common medium vesicular pores; 15 percent pebbles, 15 percent cobbles, 15 percent stones; slightly acid; abrupt smooth boundary.

B21t—2 to 15 inches; light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/4) moist; strong medium prismatic structure; extremely hard, very firm, very sticky and very plastic; common very fine to medium roots; few fine tubular pores; continuous thick clay films on pressure faces; 5 percent pebbles, 5 percent cobbles; neutral; clear wavy boundary.

IIB22t—15 to 22 inches; light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure; very hard, very firm, sticky and plastic; few fine and common medium roots; few fine tubular pores; continuous thick clay films on ped faces; 10 percent gravel; neutral; gradual wavy boundary.

IIIC1—22 to 29 inches; light yellowish brown (10YR 6/4) gravelly clay, yellowish brown (10YR 5/4) moist; massive; very hard, very firm, sticky, plastic; few fine and medium roots; few fine tubular pores; few moderately thick clay films; 25 percent pebbles; mildly alkaline; gradual wavy boundary.

IIIC2r—29 to 60 inches; highly weathered, water-laid tuff with some discontinuous lime and silica in fractures.

The solum ranges from 20 to 30 inches in thickness. Reaction ranges from slightly acid to moderately alkaline throughout the profile. The Bt horizon is clay. It is 45 to 60 percent clay and 0 to 10 percent pebbles.

Verdico Variant

The Verdico Variant consists of moderately deep, well drained soils on uplands and pediments. These soils formed in material weathered mainly from granodiorite. Slopes are 8 to 30 percent.

Typical pedon of Verdico Variant stony sandy loam, 8 to 15 percent slopes, 1,400 feet west and 2,500 feet north of the southeast corner of sec. 8, T. 20 N., R. 20 E.

Pebbles cover about 75 percent of the surface; cobbles, 1 to 5 percent; and stones, 1 percent. About 1 percent of the surface is granodiorite Rock outcrop.

A11—0 to 2 inches; grayish brown (10YR 5/2) stony sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; 60 percent pebbles, 5 percent cobbles, 1 percent stones; neutral; abrupt wavy boundary.

A12—2 to 5 inches; light gray (10YR 7/2) gravelly loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine roots; many very fine and fine vesicular pores; 20 percent gravel; neutral; abrupt wavy boundary.

A&B—5 to 12 inches; brown (10YR 5/3) gravelly clay loam, dark brown (7.5YR 3/2) moist; weak very fine subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine roots; few very fine and fine tubular pores; few thin clay films in pores; 15 percent pebbles; neutral; abrupt wavy boundary.

B2t—12 to 21 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; strong coarse prismatic structure; very hard, firm, very sticky and very plastic; common very fine exped roots; few very fine tubular pores; few slickensides; neutral; clear wavy boundary.

B3t—21 to 28 inches; brown (7.5YR 5/4) very gravelly clay, dark brown (7.5YR 4/4) moist; moderate very fine subangular blocky structure; very hard, firm, very sticky and very plastic; common very fine roots; few very fine tubular pores; many thin clay films on ped faces and in pores; 40 percent pebbles; neutral; clear wavy boundary.

Cr—28 to 30 inches; highly weathered, fractured granodiorite bedrock.

Thickness of the solum and depth to weathered bedrock range from 20 to 30 inches. Reaction ranges from slightly acid to neutral throughout the profile. The Bt horizon is clay or gravelly clay. It is 40 to 50 percent clay and 10 to 35 percent rock fragments.

Voltaire Series

The Voltaire series consists of very deep, poorly drained and very poorly drained soils on alluvial fans and flood plains. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 2 percent.

Typical pedon of Voltaire loam, slightly saline, 600 feet east of the northwest corner of sec. 36, T. 16 N., R. 19 E.

Ap—0 to 8 inches; black (10YR 2/1) moist loam; moderate medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; strongly alkaline; clear smooth boundary.

A12—8 to 15 inches; black (10YR 2/1) moist clay loam; weak medium subangular blocky structure; hard, friable, sticky and plastic; strongly alkaline; strongly effervescent; clear smooth boundary.

C1—15 to 32 inches; dark grayish brown (2.5Y 4/2) moist silty clay loam with strata of loamy coarse sand; common medium prominent dark yellowish brown (10YR 4/4) and dark gray (5Y 4/1) mottles; massive; friable, slightly sticky and slightly plastic; strongly alkaline; strongly effervescent; gradual smooth boundary.

C2—32 to 60 inches; dark yellowish brown (10YR 4/4) moist silty clay loam with thin strata of fine sandy loam and one stratum of coarse sand at a depth of about 48 inches; many medium prominent strong brown (7.5YR 5/6) mottles; massive; slightly sticky and slightly plastic; moderately alkaline.

The soil profile is deeper than 60 inches. Reaction ranges from mildly alkaline to very strongly alkaline throughout the profile. The control section (between depths of 10 inches and 40 inches) is stratified. It is 35 to 45 percent clay in the upper half, but the average texture is clay loam or silty clay loam that is 27 to 35 percent clay.

Washoe Series

The Washoe series consists of very deep, well drained soils on river terraces and alluvial fans. These soils formed in alluvium derived from mixed rock sources. Slopes are 0 to 15 percent.

Typical pedon of Washoe gravelly sandy loam, 0 to 4 percent slopes, 940 feet east and 1,700 feet south of the northwest corner of sec. 18, T. 19 N., R. 20 E.

A11—0 to 3 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 20 percent pebbles, 10 percent cobbles; slightly acid; clear smooth boundary.

A12—3 to 8 inches; pale brown (10YR 6/3) cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many fine and very fine interstitial pores; 15 percent pebbles, 15 percent cobbles; slightly acid; clear smooth boundary.

B1t—8 to 11 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine angular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; common fine and very fine pores; common thin clay films on faces of peds and in pores; 25 percent pebbles, 10 percent cobbles, 2 percent stones; slightly acid; clear smooth boundary.

B2t—11 to 24 inches; brown (7.5YR 5/4) very gravelly light sandy clay loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, sticky and slightly plastic; common fine and very fine roots; common fine and very fine pores; common moderately thick clay films in pores and bridging sand grains; 25 percent pebbles, 10 percent cobbles, 5 percent stones; neutral; gradual wavy boundary.

B3t—24 to 38 inches; light brown (7.5YR 6/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; few fine and very fine pores; few moderately thick clay films coating the coarse fragments; 20 percent pebbles, 10 percent cobbles, 10 percent stones and boulders; neutral; gradual wavy boundary.

C1—38 to 60 inches; light yellowish brown (10YR 6/4) very gravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; very few roots; many very fine interstitial pores; 40 percent pebbles; neutral.

The solum ranges from 32 to 45 inches in thickness. Reaction throughout the profile is slightly acid or neutral.

The control section has an average texture of sandy loam or sandy clay loam. It is 18 to 27 percent clay and 35 to 50 percent rock fragments.

Waspo Series

The Waspo series consists of moderately deep, well drained soils on uplands and side slopes of pediments. These soils formed in sediment derived mainly from tuffaceous materials. Slopes are 2 to 50 percent.

Typical pedon of Waspo clay, 15 to 30 percent slopes, 100 feet east and 660 feet north of the southwest corner of sec. 10, T. 19 N., R. 18 E.

A11—0 to 7 inches; dark grayish brown (10YR 4/2) clay, dark brown (10YR 4/3) moist; moderate medium prismatic structure; extremely hard, very firm, very sticky and very plastic; few medium and coarse roots; few medium and coarse tubular pores; 10 percent pebbles; slightly acid; gradual wavy boundary.

A12—7 to 24 inches; dark grayish brown (10YR 4/2) clay, dark brown (10YR 4/3) moist; moderate coarse prismatic structure; extremely hard, very firm, very sticky and very plastic; few medium and coarse

roots; few medium pores; many slickensides close enough to intersect; 10 percent pebbles; slightly acid; gradual wavy boundary.

Cr—24 to 35 inches; light gray, weathered tuff.

Depth to weathered bedrock ranges from 20 to 40 inches. Reaction ranges from slightly acid to mildly alkaline throughout the profile. The control section is clay. It is 45 to 60 percent clay and 5 to 15 percent coarse fragments.

These soils have cracks 1 to 3 centimeters wide that remain open in most years from June to November.

Wedekind Series

The Wedekind series consists of shallow, well drained soils on uplands. These soils formed in residuum mainly of volcanic rocks. Slopes are 8 to 50 percent.

Typical pedon of Wedekind gravelly loam, 15 to 30 percent slopes, 1,300 feet east and 1,200 feet south of the northwest corner of sec. 14, T. 20 N., R. 19 E.

About 30 percent of the surface is covered with gravel.

A1—0 to 2 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; 30 percent fine pebbles; slightly acid; abrupt wavy boundary.

B1t—2 to 6 inches; brown (10YR 5/3) coarse sandy loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and few fine tubular pores; neutral; abrupt wavy boundary.

B2t—6 to 14 inches; brown (7.5YR 5/4) sandy clay loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine interstitial and few very fine tubular pores; few thin clay films bridging sand grains; neutral; abrupt irregular boundary.

Cr—14 to 20 inches; strong brown (7.5YR 5/6), extremely weathered andesite, fractured and plugged with clay; dark brown (7.5YR 3/2) moist; massive; few very fine roots in cracks.

Solum thickness and depth to paralithic contact to weathered bedrock are 10 to 20 inches. Reaction ranges from slightly acid to neutral throughout the profile. The B2t horizon is sandy clay loam or clay loam. It is 22 to 32 percent clay and 5 to 35 percent rock fragments.

Wedertz Series

The Wedertz series consists of very deep, well drained soils on alluvial fans and terraces. These soils formed in alluvium derived from mixed rock sources. Slopes are 2 to 8 percent.

Typical pedon of Wedertz sandy loam, 2 to 4 percent slopes, 200 feet west and 2,550 feet south of the northeast corner of sec. 3, T. 20 N., R. 20 E.

A1—0 to 1 inch; grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many fine and very fine interstitial pores; 20 percent pebbles; slightly acid; abrupt smooth boundary.

A2—1 to 6 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; moderate thick platy structure; soft, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine vesicular pores; slightly acid; abrupt wavy boundary.

B2t—6 to 11 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; common very fine to medium roots; common very fine to medium tubular pores; common thin clay films on ped faces, in pores, and bridging sand grains; neutral; clear wavy boundary.

B3t—11 to 17 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; massive; hard, friable, sticky and plastic; common fine roots; common fine tubular pores; common thin clay films in pores and bridging sand grains; neutral; clear wavy boundary.

C1—17 to 22 inches; pale brown (10YR 6/3) sandy clay loam, dark brown (10YR 4/3) moist; massive; very hard, friable, sticky and plastic; very few roots; very few tubular pores; neutral; abrupt smooth boundary.

C2si—22 to 34 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; massive; friable to firm, slightly sticky and slightly plastic; continuous weak silica cementation with 25 percent firm and very hard durinodes; very few roots; many very fine interstitial pores; neutral; clear wavy boundary.

C3—34 to 50 inches; pale brown (10YR 6/3) gravelly loamy sand, dark brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; very few roots; very few pores; 30 percent fine gravel; neutral.

Thickness of the solum to the weakly cemented horizon ranges from 20 to 35 inches. Reaction is slightly acid or neutral throughout the profile.

The control section has an average texture of sandy clay loam or clay loam. It is 20 to 30 percent clay.

Witefels Series

The Witefels series consists of moderately deep, somewhat excessively drained soils on upland slopes. These soils formed in weathered material derived mainly from acid igneous rocks. Slopes are 15 to 70 percent.

Typical pedon of Witefels coarse sand, in an area of Witefels-Rock outcrop complex, 15 to 30 percent slopes, 2,640 feet east and 2,000 feet south of the northeast corner of sec. 3, T. 16 N., R. 19 E.

O1—1 inch to 0; fir needle duff.
A11—0 to 3 inches; dark grayish brown (10YR 4/2) coarse sand, very dark brown (10YR 2/2) moist; massive; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; many very fine and fine pores; 5 percent pebbles; medium acid; clear wavy boundary.
A12—3 to 8 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and few medium and coarse roots; many very fine and fine interstitial pores; 20 percent pebbles; medium acid; clear wavy boundary.
AC—8 to 13 inches; grayish brown (10YR 5/2) gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots and few medium and coarse roots; many very fine and fine interstitial pores; 25 percent pebbles; medium acid; clear wavy boundary.
C1—13 to 25 inches; pale brown (10YR 6/3) gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few medium and coarse roots; many fine and very fine interstitial pores; 25 percent pebbles; medium acid; clear wavy boundary.
C2—25 to 35 inches; light gray (10YR 7/2) gravelly coarse sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; very few roots; many very fine and fine interstitial pores; 30 percent pebbles; medium acid; clear wavy boundary.
C3r—35 to 45 inches; granitic gruss with rock structure that lacks roots.

The depth to the gruss ranges from 20 to 40 inches. Reaction ranges from strongly acid to slightly acid throughout the profile.

The control section is loamy coarse sand, loamy sand, or sand. It is 3 to 10 percent clay and is 15 to 30 percent rock fragments.

Wrango Series

The Wrango series consists of very deep, excessively drained soils on alluvial fans. These soils formed in alluvium from mixed rock sources. Slopes are 4 to 8 percent.

Typical pedon of Wrango gravelly loamy sand, in an area of Wrango-Ruhe complex, 4 to 8 percent slopes, 2,800 feet east and 600 feet south of the northwest corner of sec. 31, T. 24 N., R. 22 E.

A1—0 to 2 inches; pale brown (10YR 6/3) gravelly loamy sand, dark brown (10YR 3/3) moist; single grained; loose, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 30 percent gravel; mildly alkaline; clear smooth boundary.
C1—2 to 8 inches; pale brown (10YR 6/3) gravelly sand, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine through coarse roots; many very fine and fine interstitial pores; 25 percent gravel; mildly alkaline; abrupt smooth boundary.
IIC2ca—8 to 60 inches; light gray (10YR 7/2), stratified extremely gravelly sand and very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine through coarse roots; many very fine and fine interstitial pores; 60 percent pebbles, 5 percent cobbles; moderately alkaline.

Depth to nonconforming very gravelly loamy sand ranges from 6 to 10 inches. Reaction throughout the profile is mildly alkaline to moderately alkaline. The control section is loamy coarse sand or sand. It is 0 to 8 percent clay and 60 to 75 percent rock fragments.

Xman Series

The Xman series consists of shallow, well drained soils on uplands. These soils formed in residuum derived mainly from altered volcanic rocks. Slopes are 4 to 50 percent.

Typical pedon of Xman very stony loam, 15 to 30 percent slopes, 1,320 feet west and 1,320 feet north of the southeast corner of sec. 29, T. 20 N., R. 20 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine and very fine interstitial pores; 20 percent pebbles, 5 percent stones; neutral; abrupt smooth boundary.
B21t—2 to 4 inches; brown (7.5YR 4/4) light clay, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; many fine and very fine roots; many fine and very fine tubular pores; common moderately thick clay films on ped faces and in pores; neutral; clear smooth boundary.
B22t—4 to 11 inches; brown (7.5YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; strong fine and medium prismatic structure that parts to subangular blocky; firm, sticky and very plastic; many fine and very fine exped roots; few fine and very fine tubular pores; many moderately thick clay films on clay faces and in pores; neutral; clear wavy boundary.

B3t—11 to 14 inches; yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; firm, sticky and plastic; common very fine exped roots; very few pores; common moderately thick clay films on ped faces; 20 percent gravel (decomposing rhyolite); moderately alkaline; abrupt smooth boundary.

Cr—14 to 29 inches; weathered rhyolite; chains of lime in spots with discontinuous silica coatings; becomes hard at 29 inches.

The solum thickness and depth to weathered bedrock range from 10 to 20 inches, and the depth to hard bedrock ranges from 20 to 40 inches. Reaction ranges from slightly acid to moderately alkaline throughout the profile. The Bt horizon is clay or gravelly clay. It is 40 to 50 percent clay and 0 to 30 percent gravel.

Yuko Series

The Yuko series consists of shallow, well drained soils on uplands. These soils formed in residuum mainly of volcanic rock. The slope is 15 to 50 percent.

Typical pedon of Yuko stony loam, 15 to 30 percent slopes, 500 feet east and 1,100 feet north of the southwest corner of sec. 13, T. 20 N., R. 19 E.

Pebbles cover about 10 percent of the surface; cobbles, 1 to 2 percent; and stones, 2 to 3 percent. The surface is about 1 to 2 percent andesite rock outcrop.

A1—0 to 2 inches; brown (10YR 5/3) stony loam, dark brown (10YR 3/3) moist; massive; soft, friable, nonsticky and nonplastic; many very fine and fine vesicular pores; neutral; abrupt wavy boundary.

B2t—2 to 8 inches; yellowish brown (10YR 5/6) silty clay loam, dark yellowish brown (10YR 4/4) moist; strong very fine subangular blocky structure; hard, friable, sticky and plastic; common very fine to medium roots; few fine tubular pores; many thin clay films on ped faces and in pores; neutral; abrupt irregular boundary.

Cr—8 to 40 inches; strong brown (7.5YR 5/6) highly weathered andesite bedrock, dark brown (7.5YR 3/2) moist; massive; fractured; common very fine roots in fractures; clay in fractures.

The solum thickness and the depth to weathered bedrock are 6 to 14 inches. Reaction ranges from slightly acid to mildly alkaline throughout the profile. The B2t horizon is dominantly silty clay loam. It includes clay loam or sandy clay loam. It is 32 to 35 percent clay.

Zephan Series

The Zephan series consists of moderately deep, well drained soils on uplands. These soils formed in residuum and colluvium derived mainly from rhyolite and andesite. Slopes are 15 to 50 percent.

Typical pedon of Zephan stony sandy loam, 15 to 30 percent slopes, 1,700 feet east and 2,300 feet south of the northwest corner of sec. 23, T. 20 N., R. 19 E.

A11—0 to 2 inches; brown (10YR 5/3) stony sandy loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine to medium roots; many very fine to medium pores; 20 percent pebbles, 5 percent cobbles, 2 percent stones; medium acid; clear smooth boundary.

A12—2 to 8 inches; pale brown (10YR 6/3) gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; 25 percent pebbles; medium acid; clear smooth boundary.

B1—8 to 11 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; friable, sticky and slightly plastic; common fine and very fine roots; common fine and very fine pores; few thin clay films on ped faces; 15 percent pebbles; slightly acid; clear wavy boundary.

B1t—11 to 26 inches; brown (7.5YR 5/4) very cobbly clay, dark yellowish brown (10YR 4/4) moist; weak coarse prismatic structure; firm, sticky and plastic; few medium and coarse roots; few medium tubular pores; common moderately thick clay films on ped faces; 40 percent decomposing rock fragments; slightly acid; clear wavy boundary.

Bt—26 to 35 inches; brown (7.5YR 5/4) very cobbly clay, strong brown (7.5YR 5/6) moist; massive; firm, sticky and plastic; very few roots; very few pores; few moderately thick clay films in pores; 60 percent decomposing rock fragments; slightly acid; gradual irregular boundary.

Cr—35 to 42 inches; weathered rhyolite bedrock; hard and very firm grading to very hard and extremely firm; slightly acid; clear wavy boundary.

R—42 inches; hard rhyolite bedrock.

The solum thickness and depth to weathered bedrock range from 25 to 40 inches. Hard bedrock is below a depth of 40 inches. Reaction ranges from slightly acid to strongly acid throughout the profile. The Bt horizon is clay, sandy clay, or heavy clay loam. It is 35 to 45 percent clay and 35 to 60 percent rock fragments.

Formation of the Soils

Soil is a natural body on the earth's surface in which plants grow. It is a mixture of varying proportions of rocks, minerals, organic matter, water, and air. The rocks and minerals are fragmented and are partly or wholly weathered. Soils have distinctive layers, or horizons, that are the product of environmental forces acting upon material deposited or accumulated through geologic activity.

Soils differ one from the other in different localities and within short distances. The differences are the result of the interaction of five soil-forming factors. These factors are (1) climate, mainly temperature and the kind and amount of precipitation, that has existed since accumulation of the parent material; (2) relief, mainly as it affects internal and external soil properties such as drainage, aeration, susceptibility to erosion, and exposure to sun and wind; (3) biological forces, mainly the plant cover and the organisms living in and on the soil; (4) parent material, including the texture and structure of the material as well as its mineral and chemical composition; and (5) the length of time that the soil-forming factors have been operating.

The overall landscape of the area, the sequence of mountains and valleys, is the result of geologic stratigraphic and structural control. The present topography and landforms, however, are the result of events during Quaternary time. The kinds of soil that formed are indicative of the stability and age of the surfaces of the landforms on which they occur.

Climate

The average annual precipitation ranges from about 4 inches at the lowest elevation, in the east near Pyramid Lake, to about 60 inches or more in the west near Mount Rose in the Carson Range. The average annual air temperature ranges from about 52 degrees F. in the eastern part of the area to as low as 38 degrees F. in the high mountain ranges. Major climatic variations are the result of the effects of relief and distance from the Sierra Nevada Mountains. Temperature decreases with elevation. Precipitation increases with elevation but, as a result of the rain shadow effect of the Sierras, the rate of increase is higher in the western than in the eastern part of the survey area. As a consequence, the soils in the survey area reflect a general zonation with respect to elevation and longitudinal location. Because of the rain shadow effect, the survey area becomes progressively drier toward the east.

In the eastern part of the survey area, the average annual precipitation is about 4 to 8 inches and elevation is 3,800 to 7,000 feet. In this arid part of the area, weathering of parent material is slow, leaching is incomplete, and eluviation and illuviation proceed at a very slow rate. The plant cover is sparse and consists mainly of drought- and salt-tolerant shrubs. Typically, the soils are low in content of organic matter and have a thin, light-colored A horizon. Soluble salts and calcium carbonate accumulate in the soil profile at a relatively shallow depth. Typic Camborthids (Toulon series) are typical soils in this arid part of the area.

In the mid part of the survey area, the average annual precipitation is about 8 to 20 inches and elevation is 4,400 to 8,500 feet. At lower elevations (4,400 to 6,500 feet) in this part of the area, the precipitation is 8 to 12 inches. As elevation increases, precipitation increases resulting in deeper leaching of salts and calcium carbonate, decreased reaction, changes in the kind and density of vegetation, and a thicker and darker A horizon. Xerollic Haplargids (Washoe series) are typical soils formed at the lower elevations where precipitation is about 10 inches. Aridic Argixerolls (Cassiro series) are examples of soils that formed at the higher elevations.

At the higher elevations (6,500 to 8,500 feet) in the mid part of the survey area, precipitation is 14 to 20 inches and the temperature is 40 degrees to 45 degrees F. The vegetation is mostly sagebrush with a greater amount of and variation in kinds of grasses. Leaching of salts and carbonates has been more intensive, the soils are neutral or slightly acid, and the A horizon is thick and is high in content of organic matter. Pachic Argixerolls (Softscrabble series) are typical soils.

In the western part of the survey area in the Carson Range, the elevation is 5,600 to 10,000 feet. The average annual precipitation is 16 to 60 inches and the mean annual air temperature is 38 degrees to 45 degrees F. In this area also, as elevation increases precipitation increases and temperature decreases.

Typically, at the lower elevations, where precipitation is lower and temperatures are warmer, the vegetation is mostly mountainmahogany, sagebrush, and perennial grasses. The soils have high base saturation and are neutral or slightly acid. Typic Argixerolls (Ticino series) are examples of soils that have these properties. With an

additional increase in elevation and precipitation, the vegetation changes from shrub-grass to conifer trees. The base saturation of the surface layer decreases; Ultic Argixerolls (Fraval series) are examples of soils that reflect this property. With further increases in elevation and precipitation, leaching increases and the base saturation of the surface layer decreases still more. Mollic Haploxeralfs (Hirschdale series) are examples of soils that reflect this property. At the higher elevations where precipitation is highest, the soils are generally medium acid to strongly acid and have a low base saturation throughout the solum. The Ultic Haploxeralfs (Fugawee series) are typical of these soils.

In winter, freezing and thawing generally occur throughout the survey area, except in those areas that generally are insulated by snow cover. The effects of frost action are discernible in the heaving of plants and the erosion of the surface soil resulting from solifluction. At some higher elevations, freezing and thawing have fractured and displaced the bedrock. Typic Cryorthents (Graylock series), which have sandy-skeletal control sections, are examples of soils at high elevations that have been affected by frost action.

Relief

Relief, through its effects on drainage, runoff, erosion, and exposure to the sun and wind, has had an important effect on soil formation in the survey area. The mountain ranges, valleys, and flood plains reflect the gross variations in relief within the area.

The mountain ranges are mainly characterized by steep relief. Runoff is rapid or very rapid, and the hazard of erosion is high. The removal of material by erosion inhibits or prevents soil development. On unstable mountain surfaces that are subject to a high rate of geologic erosion, development in soils is limited mainly to accumulation of organic matter to form a dark-colored horizon. A cambic or an argillic horizon has formed in the soils on more stable mountain surfaces where the rate of geologic erosion has been slower. Xerollic Haplargids (Xman series), Aridic Argixerolls (Indiano series), and Mollic Haploxeralfs (Hirschdale series) are examples of soils that formed on the more stable mountain slopes and have an argillic horizon. Lithic Torriorthents (Singatse series), Lithic Xeric Torriorthents (Smallcone series), and shallow Typic Cryopsamments (Temo series) are examples of soils on less stable mountain slopes where soil formation has been unable to act on parent material long enough for any of the aforementioned horizons to have developed.

On concave and north-facing slopes, snowpockets form and remain into late spring and early summer. Soils on these slopes support a dense stand of shrubs, grass, and in some places, aspen. The soils in these areas have developed a thick, dark-colored A horizon that has a high content of organic matter. Pachic Argixerolls (Softscrabble series), Pachic Ultic Argixerolls (Jumbo series), and Argiaquic Argixerolls (Macareeno series) are examples of these soils.

Soils on strongly sloping to steep slopes developed in materials that have resulted from landslides. These soils are very deep, somewhat excessively drained soils with medium to slow runoff. These soils are coarse textured and contain boulders, stones, cobbles, and pebbles. They have not been stable for long periods of time and lack discernible soil development. Typic Xerorthents (Railcity series), which have a sandy-skeletal control section, are examples of soils that formed on a landslide.

The valleys within the survey area are essentially basins that receive drainage water from the surrounding mountain ranges. They are of three general types.

One type, characterized by the Truckee Valley and the Truckee Canyon, consists of a series of terraces cut in Tertiary-Quaternary valley-fill material and steep canyon walls cut from volcanic rock. Stream erosion has deeply dissected the valley fill. Downcutting of the valley has been interrupted several times; these interruptions are marked by the development of terraces. The dissection patterns in this area have resulted in a sloping interfluvial surface, steep interfluvial side slopes, and narrow flood plains along drainageways. The interfluvial areas and side slopes have been relatively stable over a long period of time because drainage water from uplands has bypassed these areas and flowed through dissecting channels. Aridic Argixerolls (Springmeyer series), which have a fine-loamy argillic horizon, and Abruptic Xerollic Durargids (Reno series), which have a clayey argillic horizon, are examples of soils on stable interfluves. Xerollic Haplargids (Stodick series), which have a loamy-skeletal argillic horizon, are examples of soils on steep side slopes. Aquic Xerofluvents (Notus series), which have a sandy-skeletal control section, are examples of soils in drainageways.

The second valley-type is characterized by nearly level alluvial flats bordered by sloping alluvial fans or coalesced fan piedmonts. Lemmon, Warm Springs, and Cold Springs Valleys are typical. Small playas, lakes, or intermittent lakes are located within these valleys. The nearly level alluvial flats (*14*) are, in a sense, extensions of the alluvial fan slopes. Runoff on these flats is slow, drainage is somewhat restricted, and the soils contain soluble salts. These areas are typified by Xerollic Natragids (Mellor series), which have a fine-silty natric horizon. The gently sloping to strongly sloping alluvial fans bordering basin-fill areas in Lemmon, Warm Springs, and Cold Springs Valleys have a relatively smooth, undissected surface. Soils that formed on these surfaces are well drained. Xerollic Camborthids (Haybourne series) with a coarse-loamy control section, Durixerollic Haplargids (Wedertz series), and Aridic Calcic Argixerolls (Orr Variant) with a fine-loamy argillic horizon are examples of soils on alluvial fans.

The third valley-type, which is characterized by the Pyramid Lake basin, consists of several levels of lake-shore terraces cut by Pleistocene Lake Lahontan. These shore-line features have been covered at many locations by recent alluvial fans. Typic Camborthids (Toulon series) are examples of the soils on lake terraces, and Typic Torriorthents (Bluewing series) are examples of the soils on alluvial fans.

The nearly level flood plains and low terraces along the Truckee River have a high water table and have been subject to flooding. Unless drained, the soils in these areas support dense stands of meadow vegetation that has contributed a large amount of organic matter to the soils, producing a dark-colored A horizon. Some of these soils have excess soluble salts in their upper horizons. Fluvaquentic Haplaquolls (Truckee and Voltaire series) and Duric Haplaquolls (Cradlebaugh series) are examples of soils formed on the wet bottomlands.

Biological Forces

Plants, animals, insects, and microflora are important biological forces that affect soil formation. Although animals, such as badgers and ground squirrels, and insects, such as cicadas, have had some effect on soil development, plants appear to have had the major biological influence on the soils in this survey area.

The vegetation in the area has been particularly important in reducing erosion. It has helped to maintain the stability of the land surfaces so that soil formation could take place.

On the flood plains where drainage is restricted, the dense growth of meadow vegetation has supplied the organic matter that gives Fluvaquentic Haplaquolls (Voltaire series) and Fluvaquentic Haploxerolls (Truckee series) soils a dark-colored A horizon.

Because of climatic differences, the kinds and amounts of plants vary considerably as elevation increases. On alluvial flats, terraces, and alluvial fans at low elevations, especially in the eastern part of the area, the main plants are drought- and salt-tolerant shrubs. Because of the scarcity of available moisture, plants cover only a small part of the surface. They add little organic matter to the soils and provide little protection from the wind and sun. Salt-tolerant shrubs tend to recycle salts from the deeper layers to the surface soil.

Alluvial fans, terraces, and foothills at higher elevations support a plant cover of shrubs and grass that is transitional from desert shrubs.

The central mountainous areas support a denser stand of shrubs, grasses, and in some places, trees. Because the vegetation is more abundant, the A horizon of the soils in these areas is thick, is high in organic matter, and is dark in color.

The mountainous area of the Carson Range supports mostly coniferous forest. The soils that formed under this plant cover have a thin mat of litter and duff one-half inch to about 3 inches thick. The forest litter is attacked by fungi and other microorganisms. The fungi are particularly effective because of their ability to decompose surface litter where moisture content is low and air circulation is good. They are especially active in acid soils such as those formed under forest cover and contribute to the development of these soils.

Parent Material

Parent material is the weathered rock or unconsolidated material from which soils form. The hardness, grain size, and porosity of the parent material and its mineral and chemical composition greatly influence soil formation.

The main sources of parent material in the survey area are intrusive and extrusive igneous rocks, metamorphic rocks, sedimentary rocks, colluvium, alluvium, and eolian material, including volcanic ash and sand (*3*).

Of the intrusive igneous rocks, granodiorite and quartz monzonite are the most abundant. These rocks occur mainly in the Carson Range, Peterson Mountains, and Dogskin Mountains; on Hungry Mountain; and on the hills north of Sun Valley. The intrusive rocks contain minerals that weather to clay. Soils formed in materials derived from these kinds of rocks have an argillic horizon if the surfaces of the landforms have been stable for a sufficiently long period of time. Aridic Argixerolls (Acrelane series) and Xerollic Haplargids (Surgem series) are examples of these soils. Soils that formed in material from granitic rock that are on steeper slopes and receive more precipitation generally are eroding. Consequently, they may lack soil development except for some accumulation of organic matter in the A horizon. They are generally sandy and contain rock fragments. Typic Xeropsamments (Toiyabe series) and Typic Cryorthents (Graylock series) are examples of these soils.

The extrusive igneous rocks include basalt, andesite and rhyolite, flow breccias, basaltic andesite, and pyroxene andesite flows. Some of these volcanic rocks occur in all mountain ranges. Because extrusive rocks contain appreciable quantities of minerals that weather to clay, most soils that formed in these materials on stable slopes of mountains and foothills have an argillic horizon. The argillic horizon is generally quite clayey. Typic Argixerolls (Booford series), Aridic Calcic Argixerolls (Arzo series), and Xerollic Haplargids (Xman series) are examples of these soils.

Metamorphic rocks are the source of the parent material in a limited area, mainly on Peavine Mountain, the Virginia Range, Peterson Mountain, and Freds Mountain. Most of these rocks contain minerals that weather to clay. Xerollic Haplargids (Flex series) and Aridic Argixerolls (Koontz and Indiano series) are examples of soils that have an argillic horizon and formed in material derived from metamorphic rocks.

Pliocene sedimentary rocks occur extensively in the Truckee River Valley and Hungry Valley and, less extensively, in Warm Springs Valley. These rocks consist of old alluvial and lakebed deposits containing interbedded volcanic ash, tuff, and some diatomaceous earth. Xerollic Haplargids (Chalco and Verdico series) are examples of soils that formed on stable surfaces in material derived from these rocks. In areas where the protective vegetation has been lost, the soils have been eroded and soft parent rock has been exposed. Badland is a common component of soil map units in areas where erosion has been active in these parent materials.

Colluvium is parent material that has accumulated on steep mountain slopes as a result of gravitational forces. Colluvium generally is poorly sorted and contains many rock fragments. In this survey area, most colluvial landscapes have been stable long enough for a weak argillic horizon to have formed. Typic Haplargids (Fireball series) and Xerollic Haplargids (Hefed series) are examples of soils that formed in colluvial material on stable landscapes.

Alluvium deposited as alluvial fans, alluvial flats, and flood plains consists of sandy, loamy, and clayey material of generally mixed mineralogy that has been eroded from surrounding mountains.

Alluvium from mixed rock sources deposited as alluvial fans is mostly loamy and contains variable amounts of pebbles, cobbles, and stones. It is porous and contains minerals that weathered to produce clay and soluble silica for cementation of duripans. Xerollic Durargids (Trosi series) and Haploxerollic Durargids (Spasprey series) are examples of soils with an argillic horizon and a duripan that formed in alluvium on stable alluvial fans. Alluvium derived from granitic rock usually results in sandy soils that contain various amounts of pebbles, cobbles, and stones. Torriorthentic Haploxerolls (Linhart series) and Torripsammentic Haploxerolls (Mottsville series) are examples of sandy soils formed in granitic alluvium.

Alluvium from mixed rock sources deposited as alluvial flats is silty or clayey and contains soluble salts. The soils that formed in this material typically have a natric horizon. Xerollic Natrargids (Mellor series) that have a fine-silty natric horizon and Xerollic Natrargids (Updike series) that have a clayey natric horizon are typical examples.

Sandy eolian materials are of limited extent in this survey area. They occur mainly as dunes east of Washoe and Pyramid Lakes. Typic Torripsamments (Isolde series) and Xeric Torripsamments (Incy series) have formed in parts of these areas where the parent materials have been stabilized by vegetation.

Time

Time is required for the formation of soils. The amount of time required depends upon the other soil-forming factors. The thickness and other characteristics of the A and B horizons and other horizons reflect the relative age of soils. The age or strength of expression of the horizons is a reflection of the amount of weathering of parent material resulting from the interaction of moisture, temperature, and biological activity over time.

The soils in this survey area range from a few years to possibly a few hundred thousand years or more in age. This range in age is a major reason for the many kinds of soil in the area.

The interaction of time and other soil-forming factors is not well understood by soil scientists and geologists. Many soil scientists and some geologists think that weathering of parent material and development of soil profiles have been essentially continuous, with little change in rate throughout Quaternary time (*11, 12, 15, 18*). Recently, however, geologists concerned with differentiating Quaternary deposits have proposed that soil development has not proceeded continuously at the same rate but has taken place intermittently at rapid rates (*8, 9, 10, 14*).

These geologists have developed a system for mapping soil stratigraphic units that uses weathering profiles as stratigraphic markers to differentiate and correlate Quaternary deposits. This system is based on the assumption that weathering profiles formed as a result of infrequent combinations of climatic factors that induced minimal rates of erosion and deposition and greatly accelerated the rate of chemical weathering.

In spite of these disagreements concerning the relative influences of time and other soil-forming factors, the concept of intermittency of soil formation has been supported by numerous studies and provides a practical basis for discussing the age of soils in the survey area in relation to geologic and climatic units in Quaternary time.

The kinds of subsurface diagnostic horizons and other subsurface diagnostic properties and their strength of expression provide general clues to the age of the soils. Important subsurface diagnostic horizons in soils in the area are argillic, natric, and cambic horizons and horizons exhibiting silica cementation.

In this area, prominent argillic horizons generally occur only in soils that formed mainly during the Pleistocene. This has been established by studies in the Southwest (*5, 6*) and is further supported in Soil Taxonomy (*17*). As age increases and other conditions remain constant, argillic horizons become finer in texture, become somewhat thicker, and tend to develop an abrupt upper boundary. Weakly expressed, thin argillic horizons may have formed during very late Pleistocene or early Holocene time.

A natric horizon is a kind of argillic horizon that formed under the influence of a high content of exchangeable sodium. The effect of sodium on the dispersion of clay may tend to accelerate the rate of formation of an argillic horizon. This factor is not believed to be significant, however, except in weakly expressed natric horizons that

formed on Holocene surfaces. Following earlier development as argillic horizons, prominent natric horizons may have developed their present characteristics as a result of sodium supplied in eolian deposits. Transportation and deposition of sodium salts in eolian material are believed to be important present-day processes that affect the physical and chemical properties of soils in the area.

The strength of expression of diagnostic subsurface horizons in the soils in the area indicates a sequence of soils that range in age from present-day (Holocene) to early-late Pleistocene or possibly older.

The youngest soils in the area are those that formed in recently aggraded material or in material recently exposed by erosion. Included among these soils are: Typic Torriorthents (Bluewing and Trocken series), which formed in recent alluvium; Lithic Xeric Torriorthents (Skedaddle series), which formed in material weathered from igneous rocks on upland slopes where erosion has been active; and Torripsamments (Isolde and Incy series), which formed on stabilized sand dunes.

Somewhat older than the youngest soils are soils that formed in alluvium on wet flood plains or on slowly aggrading inset fans and soils on mountain slopes that have relatively recently eroded. These soils have been stable long enough to have accumulated organic matter and formed a dark-colored A horizon. They do not have an argillic, natric, or cambic horizon, a duripan, or durinodes. They are probably less than about 1,000 years old. Typic Haplaquolls (Jubilee series) and Fluvaquentic Haploxerolls (Truckee series) are examples of soils that formed on wet flood plains. Torriorthentic Haploxerolls (Linhart series) are examples of soils that formed on slowly aggrading alluvial fans. Entic Haploxerolls (Haypress series) are examples of soils that formed on steep mountain slopes.

Soils that formed in alluvium and have either subsurface horizons containing durinodes or horizons with very weak silica cementation are also older than the youngest soils and possibly are slightly older than the soils that have a dark-colored A horizon as their only major diagnostic feature. These soils are on alluvial flats and low stream terraces and formed in saline and alkali parent material containing an appreciable amount of volcanic ash. The presence of volcanic ash as a source of soluble silica with alkaline reaction probably contributes to relatively rapid formation of durinodes and incipient silica cementation. Duric Haplaquolls (Cradlebaugh series) and Aquentic Durorthids (Vamp series) are examples of soils that have horizons with incipient silica cementation as a major diagnostic feature.

Stable Holocene land surfaces less than about 10,000 years and more than about 2,000 years old are not extensive in the survey area. The soils that formed on these surfaces have a cambic horizon. Xerollic Camborthids (Haybourne series) and Aridic Haploxerolls (Surprise series) have a cambic horizon and formed on alluvial fans. Typic Camborthids (Toulon series) that formed on the shore-line deposits of Pleistocene Lake Lahontan also have a cambic horizon.

Members of about 85 series, more than 50 percent of the soils series mapped in the survey area, have a relict argillic horizon and are believed to be of late-Pleistocene age. These soils occur extensively on mountains, foothills, alluvial fans, and terraces. The existence of extensive areas of these kinds of soils is evidence that major erosional and depositional events have not occurred or have been minor in extent since late Pleistocene time.

Late Pleistocene time is the time period from approximately 10,000 to 250,000 years before present time (*13*). For purposes of discussion, this time period is separated into latest Pleistocene or earliest Holocene, late-late Pleistocene, mid-late Pleistocene, and early-late Pleistocene.

Stable latest Pleistocene or earliest Holocene land surfaces are not believed to be extensive in this area. Soils that formed on these surfaces have a thin, weak or minimal argillic or natric horizon. Xerollic Haplargids (Flex series), which have a loamy-skeletal argillic horizon underlain by bedrock at a depth of less than 14 inches, are an example of a soil of this age that formed on mountain slopes. Typic Haplargids (Fireball series) and Xerollic Haplargids (Hefed series), which have a thin loamy-skeletal argillic horizon, are examples that formed in colluvium on foothills and mountains. Xeralfic Haplargids (Kayo series), which have a weak loamy-skeletal argillic horizon, are examples of soils formed on alluvial fans. Xerollic Natrargids (Mellor series), which have a minimal fine-silty natric horizon, are examples of soils formed on low terraces or alluvial flats.

Stable late-late Pleistocene land surfaces are very extensive in the survey area. Xerollic Haplargids (Yuko series), which have a relatively thin loamy (silty clay loam) argillic horizon less than 20 inches thick over bedrock, are examples of soils of this age that formed on foothills. Aridic Argixerolls (Indiano series) and Ultic Haploxeralfs (Fraval series), which have a loamy-skeletal argillic horizon, are examples of soils that formed on mountain slopes. Duric Haplargids (Aladshi series) and Aridic Argixerolls (Orr series), which have a fine-loamy argillic horizon, are examples of soils of this age that formed on alluvial fans and terraces. Aridic Argixerolls (Oest series), which have a loamy-skeletal argillic horizon that is 18 to 25 percent clay, occur on lower terraces of the Truckee River and have been correlated with late-late Pleistocene age (*7*). Xerollic Haplargids (Stodick series), which have a loamy-skeletal argillic horizon over soft bedrock, formed on side slopes of pediments. These surfaces are believed to have been stable since the last active erosion took place during late-late Pleistocene.

Stable mid-late Pleistocene land surfaces are also extensive. Xerollic Haplargids (Surgem series), which

have a clayey-skeletal argillic horizon formed in granitic residuum, and Xerollic Haplargids (Risley series) and Aridic Argixerolls (Cagle series), which have a clayey argillic horizon and formed in volcanic residuum, are examples of soils of mid-late Pleistocene age on foothills. Typic Argixerolls (Booford series) and Mollic Haploxeralfs (Hirschdale series), which have a clayey argillic horizon, are examples of these kinds of soils formed on mountain slopes. Xerollic Haplargids (Greenbrae series), which have a fine-loamy argillic horizon, are examples of soils of this age on alluvial fans and terraces. Aridic Argixerolls (Leviathan series), which contain a thick argillic horizon and are on high terraces along the Truckee River, have been correlated with a mid-late Pleistocene age (*7*).

Stable early-late Pleistocene or possibly older land surfaces are generally limited to dissected alluvial fan remnants, terrace remnants, and pediment surfaces cut in soft Tertiary rock. Aridic Durixerolls (Bernard series) and Abruptic Xerollic Durargids (Reno series), which have a thick clayey argillic horizon and a thick duripan, formed on these old alluvial fan or terrace remnant surfaces. Xerollic Paleargids (Verdico series), which have a thick clayey argillic horizon that is 45 to 60 percent clay, formed on pediment surfaces.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month. The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3.5
Low	3.5 to 5
Moderate	5 to 7.5
High	more than 7.5
Very high	More than 12

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Component landform. Commonly, a small landform that makes up part of the area of a major landform and was created by partial dissection of, or by alluvial or eolian accretion on that larger, major landform. A component landform is about the smallest landform that can be usefully conceived of as a single unit. Its morphological parts are landform elements, and the sideslope element may be subdivided into slope components (*13*).

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons.

Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fast intake (in tables). The rapid movement of water into the soil.

Fan apron. A component landform consisting of a sheet-like mantle of relatively young alluvium covering part of an older fan piedmont (and occasionally alluvial fan) surface. It somewhere buries a pedogenic soil that can be traced to the edge of the fan apron, where the soil emerges as the land surface, or relict soil. No buried soils occur within a fan-apron mantle; rather, they separate mantles (*13*).

Fan collar. A component landform consisting of a thin, short, relatively young mantle of alluvium along the very upper margin of a major alluvial fan at a mountain front. The mantle somewhere buries a pedogenic soil that can be traced to the edge of the fan collar where it emerges as the land surface, or relict soil (*13*).

Fan remnant. A generic term for component landforms that are the remaining parts of various older fan landforms that have been either dissected (erosional fan remnants) or partly buried (nonburied fan remnants). Erosional fan remnants must have a flattish summit of relict fan surface; nonburied fan remnants are all relict fan surface. Fan remnants may be specifically identified—for example, fan-piedmont remnants and inset-fan remnants (*13*).

Fan skirt. A major landform consisting of laterally coalescing, small alluvial fans that issue from gullies that are cut into, or that are extensions of, inset fans of the fan piedmont and that merge along their toe slopes with the basin floor. Fan skirts are smooth or only slightly dissected and ordinarily do not comprise component landforms (*14*).

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when

light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Frost heaving. Upward movement of soil caused by freezing and thawing of free water in the soil.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hummocky. Refers to a landscape of hillocks, separated by low sags, having sharply rounded tops and steep sides. Hummocky relief resembles rolling or undulating relief, but the tops of ridges are narrower and the sides are shorter and less even.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow

over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Inset fan. A flood plain of a commonly ephemeral stream that is confined between fan remnants, basin-floor remnants, ballenas, or closely opposed fan toe slopes. Its transversely-level cross section is evidence of alluviation of a fluve. It must be wide enough that raw channels cover only a fraction of this component landform's surface (*14*).

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor, on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of

species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Snow pockets. Concave areas where snow accumulates and remains for longer periods than in adjacent areas.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity are—

	SAR
Slight	Less than 13:1
Moderate	13-30:1
Strong	More than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated

regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[The data for Nixon, Nevada, were recorded in the period 1952-74; and the data for Reno and Virginia City were recorded in the period 1951-75]

Month	Temperature						Precipitation				
	Average daily maximum (°F)	Average daily minimum (°F)	Average daily (°F)	2 years in 10 will have-- Maximum temperature higher than-- (°F)	2 years in 10 will have-- Minimum temperature lower than-- (°F)	Average number of growing degree days[1] (Units)	Average (In)	2 years in 10 will have-- Less than-- (In)	2 years in 10 will have-- More than-- (In)	Average number of days with 0.1 inch or more	Average snowfall (In)
	Nixon, Nevada										
January----	45.6	21.6	33.7	67	-1	50	.78	.29	1.17	2	0.6
February---	51.1	25.8	38.5	70	8	100	.52	.14	.81	2	0.3
March------	56.7	28.8	42.8	78	11	168	.66	.13	1.07	3	1.4
April------	62.9	32.2	47.6	84	17	250	.59	.19	.89	2	0.8
May--------	74.7	41.1	57.9	94	24	555	.96	.00	1.65	2	0.0
June-------	83.0	48.5	65.8	102	31	774	.84	.12	1.40	2	0.0
July-------	92.4	54.1	73.3	104	39	1,032	.23	.00	.40	1	0.0
August-----	90.8	51.4	71.2	103	37	967	.38	.00	.67	2	0.0
September--	82.5	42.7	62.6	96	27	678	.29	.00	.50	1	0.0
October----	70.0	34.0	52.0	88	16	380	.29	.00	.51	1	0.0
November---	54.6	24.9	40.7	76	10	117	.70	.23	1.07	2	0.0
December---	44.3	21.6	33.2	63	-1	40	.91	.41	1.30	2	1.0
Year-------	67.4	35.6	51.6	105	-9	5,111	7.15	5.85	9.08	22	4.1
	Reno, Nevada										
January---	44.8	19.1	32.0	66	-6	44	1.25	.56	1.82	4	7.0
February--	51.0	23.3	37.2	71	2	71	.92	.15	1.50	3	5.1
March-----	55.9	25.2	40.8	76	9	101	.75	.16	1.21	3	5.7
April-----	63.2	29.1	46.2	84	16	213	.50	.07	.82	2	2.0
May-------	72.5	36.9	54.7	92	22	456	.78	.09	1.29	2	1.4
June------	81.7	42.8	62.3	100	30	669	.36	.01	.62	1	0.0
July------	91.3	47.5	69.4	101	35	911	.27	.03	.45	1	0.0
August----	58.9	45.0	67.0	101	31	837	.27	.00	.46	1	0.0
September-	81.5	38.4	60.0	95	24	600	.27	.01	.46	1	0.0
October---	69.6	30.0	49.8	88	15	308	.36	.00	.62	1	0.4
November--	55.4	23.8	39.6	75	8	73	.64	.13	1.03	2	1.7
December--	45.9	19.0	32.4	64	-4	26	1.22	.23	1.97	3	5.4
Year------	66.8	31.7	49.3	102	-8	4,309	7.59	5.74	9.30	24	28.7

See footnote at end of table.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.1 inch or more	Average snowfall
	(°F)	(°F)	(°F)	(°F)	(°F)	(Units)	(In)	(In)	(In)		(In)
Virginia City, Nevada											
January---	41.4	24.3	33.0	60	4	39	1.91	.53	3.01	5	9.7
February--	44.3	25.9	35.1	61	8	48	1.36	.27	2.20	4	10.9
March-----	48.7	29.0	38.9	65	11	103	1.17	.15	1.94	3	6.8
April-----	54.6	33.4	44.0	74	17	198	.56	.16	.87	2	2.1
May-------	64.8	41.7	53.1	65	21	419	.90	.04	1.52	2	0.9
June------	74.3	50.3	62.5	94	32	675	.72	.05	1.22	2	0.0
July------	83.4	58.2	70.8	94	43	955	.29	.00	.51	1	0.0
August----	81.5	56.1	68.8	94	36	893	.42	.00	.75	1	0.0
September-	74.2	49.6	61.8	89	29	654	.36	.00	.63	1	0.0
October---	61.2	39.6	50.4	79	20	398	.70	.00	1.20	2	1.2
November--	49.5	31.3	40.4	69	14	91	1.01	.20	1.63	3	5.2
December--	42.1	25.5	33.8	60	4	53	1.99	.56	3.14	5	12.8
Year------	60.0	38.7	49.4	96	0	4,466	11.39	6.99	15.21	31	49.6

[1] A growing degree day is an index of the amount of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[The data for Nixon, Nevada, were recorded in the period 1952-74; and the data for Reno and Virginia City were recorded in the period 1951-75]

Probability	Temperature		
	24°F or lower	28°F or lower	32°F or lower
	Nixon, Nevada		
Last freezing temperature in spring:			
1 year in 10 later than--	May 3	May 22	June 8
2 years in 10 later than--	April 28	May 14	June 1
5 years in 10 later than--	April 19	April 28	May 16
First freezing temperature in fall:			
1 year in 10 earlier than--	October 2	September 12	September 10
2 years in 10 earlier than--	October 8	September 19	September 17
5 years in 10 earlier than--	October 19	October 3	September 30
	Reno, Nevada		
Last freezing temperature in spring:			
1 year in 10 later than--	May 13	May 27	June 19
2 years in 10 later than--	May 9	May 21	June 13
5 years in 10 later than--	April 30	May 11	May 31
First freezing temperature in fall:			
1 year in 10 earlier than--	September 18	September 13	August 22
2 years in 10 earlier than--	September 25	September 19	August 30
5 years in 10 earlier than--	October 9	September 29	September 13

TABLE 2.--FREEZE DATES IN SPRING AND FALL--Continued

Probability	Temperature		
	24°F or lower	28°F or lower	32°F or lower
	Virginia City, Nevada		
Last freezing temperature in spring:			
1 year in 10 later than--	May 20	June 2	June 16
2 years in 10 later than--	May 11	May 25	June 9
5 years in 10 later than--	April 24	May 11	May 25
First freezing temperature in fall:			
1 year in 10 earlier than--	September 20	September 9	August 22
2 years in 10 earlier than--	October 6	September 25	September 7
5 years in 10 earlier than--	November 4	October 25	October 9

TABLE 3.--GROWING SEASON

[The data for Nixon, Nevada, were recorded in the period 1952-74; and the data for Reno and Virginia City were recorded in the period 1951-75]

Probability	Length of growing season if daily minumum temperature is--		
	Higher than 24°F	Higher than 28°F	Higher than 32°F
	Days	Days	Days
	Nixon, Nevada		
9 years in 10	157	125	112
8 years in 10	166	135	119
5 years in 10	183	155	134
2 years in 10	>365	>365	153
1 year in 10	>365	>365	>365
	Reno, Nevada		
9 years in 10	135	120	70
8 years in 10	144	127	82
5 years in 10	161	140	104
2 years in 10	178	154	127
1 year in 10	187	161	139
	Virginia City, Nevada		
9 years in 10	148	128	101
8 years in 10	161	139	110
5 years in 10	187	160	128
2 years in 10	215	183	147
1 year in 10	234	198	160

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
101	Aquinas sandy loam, 4 to 8 percent slopes	2,815	0.3
102	Aquinas sandy loam, 8 to 15 percent slopes	1,860	0.2
106	Aquinas sandy loam, 8 to 15 percent slopes, eroded	3,785	0.4
110	Jowec Variant sandy loam, 4 to 8 percent slopes	620	0.1
111	Jowec Variant-Greenbrae sandy loams, 4 to 15 percent slopes	1,045	0.1
120	Doten silty clay, 0 to 2 percent slopes	2,095	0.2
121	Doten silty clay, 8 to 15 percent slopes	515	0.1
130	Greenbrae sandy loam, clayey substratum, 0 to 2 percent slopes	800	0.1
131	Greenbrae sandy loam, 0 to 2 percent slopes	1,455	0.1
132	Greenbrae sandy loam, 2 to 4 percent slopes	2,955	0.3
134	Greenbrae sandy loam, clayey substratum, 4 to 8 percent slopes	325	*
136	Greenbrae sandy loam, 4 to 8 percent slopes	1,935	0.2
140	Haybourne loamy sand, 2 to 4 percent slopes	6,085	0.6
141	Haybourne loamy sand, 4 to 8 percent slopes	13,869	1.4
142	Haybourne loamy sand, 8 to 15 percent slopes	1,674	0.2
150	Doten Variant silty clay, slightly saline	460	*
151	Doten Variant silty clay, strongly saline	315	*
160	Incy sand, 4 to 8 percent slopes	2,620	0.3
161	Incy fine sand, hilly	1,996	0.2
171	Indian Creek gravelly sandy loam, 0 to 4 percent slopes	1,690	0.2
172	Indian Creek sandy loam, 4 to 8 percent slopes	1,765	0.2
173	Indian Creek sandy loam, 8 to 15 percent slopes	1,005	0.1
174	Indian Creek extremely stony sandy loam, 2 to 8 percent slopes	6,683	0.7
175	Indian Creek very cobbly loam, 4 to 8 percent slopes	3,145	0.3
176	Indian Creek-Reno-Washoe association	6,302	0.6
190	Manogue cobbly clay, 2 to 8 percent slopes	1,894	0.2
191	Manogue cobbly clay, 8 to 15 percent slopes	1,200	0.1
192	Manogue cobbly clay, 15 to 30 percent slopes	325	*
200	Northmore sandy loam, 0 to 2 percent slopes	230	*
201	Northmore sandy loam, 2 to 4 percent slopes	750	0.1
202	Northmore sandy loam, 4 to 8 percent slopes	875	0.1
203	Northmore sandy loam, 8 to 15 percent slopes	785	0.1
210	Luppino gravelly sandy loam, 4 to 8 percent slopes	3,330	0.3
211	Luppino gravelly sandy loam, 8 to 15 percent slopes	3,050	0.3
221	Oppio cobbly sandy loam, 8 to 15 percent slopes	870	0.1
222	Oppio cobbly sandy loam, 15 to 30 percent slopes	1,425	0.1
223	Oppio-Rezave-Rock outcrop association	643	0.1
230	Cradlebaugh loam	1,045	0.1
240	Updike loam	3,215	0.3
241	Updike loam, gravelly substratum	480	*
250	Cassiro gravelly sandy loam, 2 to 4 percent slopes	880	0.1
251	Cassiro gravelly sandy loam, 4 to 8 percent slopes	2,695	0.3
252	Cassiro gravelly sandy loam, 8 to 15 percent slopes	1,420	0.1
260	Acrelane-Rock outcrop complex, 15 to 50 percent slopes	28,515	2.8
262	Acrelane very stony sandy loam, 8 to 15 percent slopes	5,230	0.5
280	Wedekind gravelly loam, 8 to 15 percent slopes	1,145	0.1
281	Wedekind gravelly loam, 15 to 30 percent slopes	1,315	0.1
282	Wedekind gravelly sandy loam, 30 to 50 percent slopes	855	0.1
290	Verdico Variant stony sandy loam, 8 to 15 percent slopes	600	0.1
291	Verdico Variant very stony sandy loam, 15 to 30 percent slopes	560	0.1
300	Surgem stony sandy loam, 8 to 15 percent slopes	940	0.1
301	Surgem-Rock outcrop complex, 15 to 30 percent slopes	750	0.1
302	Surgem-Rock outcrop complex, 30 to 50 percent slopes	605	0.1
310	Risley-Rock outcrop complex, 8 to 15 percent slopes	1,290	0.1
311	Risley-Rock outcrop complex, 15 to 30 percent slopes	4,440	0.5
312	Risley cobbly loam, 15 to 30 percent slopes	1,540	0.2
313	Risley cobbly clay loam, 8 to 15 percent slopes	355	*
314	Risley-Xman-Rock outcrop association	3,440	0.3
341	Yuko stony loam, 15 to 30 percent slopes	1,110	0.1
342	Yuko-Reywat-Rock outcrop association	6,023	0.6
350	Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes	1,895	0.2
351	Mizel-Skedaddle-Rock outcrop association	4,255	0.4
360	Pits	1,440	0.1
370	Lemm very gravelly coarse sandy loam, 4 to 8 percent slopes	2,090	0.2
390	Duckhill stony loam, 30 to 50 percent slopes	1,120	0.1
391	Duckhill-Hirschdale-Fraval association	6,035	0.6
400	Jubilee Variant loamy sand, strongly saline	560	0.1
401	Jubilee Variant loamy sand, slightly saline	275	*
403	Jubilee Variant loam, slightly saline	415	*
410	Ophir loamy sand, 2 to 8 percent slopes	420	*

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
411	Ophir loamy sand, 0 to 2 percent slopes	425	*
420	Godecke loamy sand	3,155	0.3
423	Godecke Variant loamy sand	270	*
430	Sagouspe Variant loamy very fine sand	947	0.1
431	Sagouspe Variant loamy very fine sand, wet	763	0.1
440	Jubilee sandy loam	600	0.1
441	Jubilee clay loam	230	*
442	Jubilee gravelly sand	280	*
443	Jubilee loamy sand	270	*
445	Jubilee sandy loam, drained	320	*
450	Voltaire loam	435	*
451	Voltaire loam, slightly saline	1,235	0.1
452	Voltaire loam, strongly saline	710	0.1
454	Voltaire silty clay, drained	780	0.1
455	Voltaire-Truckee complex, drained	930	0.1
456	Voltaire clay loam, gravelly substratum	805	0.1
460	Surprise loamy sand, 2 to 4 percent slopes	1,705	0.2
461	Surprise coarse sandy loam, 4 to 8 percent slopes	545	0.1
470	Dalzell loamy fine sand	1,690	0.2
480	Holbrook gravelly loamy sand, 2 to 8 percent slopes	870	0.1
482	Holbrook cobbly loamy sand, 2 to 8 percent slopes	2,715	0.3
490	Graufels bouldery sand, 8 to 15 percent slopes	2,035	0.2
491	Graufels-Rock outcrop complex, 15 to 30 percent slopes	3,010	0.3
492	Graufels bouldery sand, 15 to 30 percent slopes	1,155	0.1
493	Graufels-Glenbrook complex, 8 to 50 percent slopes	12,670	1.3
494	Graufels gravelly loamy coarse sand, 4 to 8 percent slopes	835	0.1
495	Graufels-Glenbrook-Rock outcrop complex, 4 to 15 percent slopes	3,845	0.4
496	Graufels-Glenbrook-Haypress association	12,453	1.2
500	Mottsville sand, 0 to 4 percent slopes	4,970	0.5
504	Mottsville sand, 8 to 15 percent slopes	2,685	0.3
505	Mottsville gravelly coarse sand, 4 to 8 percent slopes	4,930	0.5
510	Settlemeyer fine sandy loam, 0 to 2 percent slopes	680	0.1
513	Settlemeyer-Notus complex	1,055	0.1
514	Settlemeyer gravelly loam, 2 to 4 percent slopes	813	0.1
520	Dressler loamy sand, 2 to 4 percent slopes	2,385	0.2
530	Sagouspe sand	875	0.1
531	Sagouspe fine sandy loam	540	0.1
532	Sagouspe gravelly sand, gravelly substratum	900	0.1
550	Leviathan stony sandy loam, 0 to 2 percent slopes	285	*
551	Leviathan stony sandy loam, 2 to 8 percent slopes	1,020	0.1
553	Leviathan stony sandy loam, 15 to 30 percent slopes	450	*
554	Leviathan very stony sandy loam, 2 to 8 percent slopes	1,660	0.2
557	Leviathan very stony sandy loam, 30 to 50 percent slopes	505	0.1
559	Leviathan extremely stony sandy loam, 2 to 8 percent slopes	1,980	0.2
570	Turria loam	1,255	0.1
585	Barnard-Trosi association	5,520	0.6
590	Springmeyer stony loam, 0 to 2 percent slopes	730	0.1
591	Springmeyer stony loam, 2 to 4 percent slopes	890	0.1
595	Springmeyer sandy clay loam, 0 to 2 percent slopes	615	0.1
600	Idlewild clay loam, drained	1,450	0.1
601	Idlewild sandy loam, drained	470	*
602	Idlewild gravelly sandy loam	305	*
612	Verdico very stony sandy loam, 4 to 8 percent slopes	1,035	0.1
613	Verdico extremely stony sandy loam, 8 to 15 percent slopes	1,070	0.1
614	Verdico extremely stony sandy loam, 15 to 30 percent slopes	995	0.1
615	Verdico sandy loam, 4 to 8 percent slopes	545	0.1
620	Orr stony sandy loam, 2 to 4 percent slopes	1,445	0.1
621	Orr stony sandy loam, 4 to 8 percent slopes	2,035	0.2
622	Orr stony sandy loam, gravelly substratum, 2 to 4 percent slopes	765	0.1
623	Orr sandy loam, 0 to 2 percent slopes	1,155	0.1
624	Orr gravelly sandy loam, 0 to 2 percent slopes	760	0.1
630	Fleischmann gravelly clay loam, 2 to 4 percent slopes	1,450	0.1
631	Fleischmann gravelly clay loam, 4 to 8 percent slopes	1,035	0.1
632	Fleischmann loam, 8 to 15 percent slopes	230	*
640	Notus stony loamy fine sand	675	0.1
650	Chalco very stony clay loam, 15 to 30 percent slopes	1,405	0.1
651	Chalco very stony clay loam, 30 to 50 percent slopes	590	0.1
652	Chalco stony loam, 4 to 8 percent slopes	1,595	0.2
653	Chalco cobbly sandy loam, 8 to 15 percent slopes	1,405	0.1
654	Chalco-Celeton Variant complex, 2 to 8 percent slopes	3,123	0.3

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
660	Oest very bouldery sandy loam, 2 to 8 percent slopes	1,295	0.1
661	Oest bouldery sandy loam, 2 to 8 percent slopes	2,665	0.3
662	Oest extremely stony sandy loam, 2 to 8 percent slopes	2,565	0.3
663	Oest very gravelly loam, 15 to 30 percent slopes	350	*
664	Oest very gravelly loam, 8 to 15 percent slopes	1,000	0.1
668	Oest very bouldery sandy loam, 30 to 50 percent slopes	780	0.1
669	Oest gravelly sandy loam, 0 to 2 percent slopes	685	0.1
670	Galeppi sandy loam, 4 to 8 percent slopes	1,785	0.2
671	Galeppi sandy loam, 8 to 15 percent slopes	3,615	0.4
673	Galeppi sandy loam, 15 to 30 percent slopes	2,440	0.2
674	Galeppi stony sandy loam, 8 to 15 percent slopes	1,260	0.1
676	Galeppi-Barnard association	520	0.1
681	Reno very stony fine sandy loam, 8 to 15 percent slopes	1,685	0.2
683	Reno stony sandy loam, 2 to 8 percent slopes	7,233	0.7
730	Stodick very stony loam, 15 to 30 percent slopes	3,155	0.3
731	Stodick stony loam, 30 to 50 percent slopes	1,620	0.2
740	Blackwell sandy loam	240	*
752	Toiyabe-Corbett-Rock outcrop association, moderately steep	1,310	0.1
753	Toiyabe-Corbett-Rock outcrop association, steep	5,095	0.5
754	Toiyabe-Rock outcrop complex, 50 to 70 percent slopes	755	0.1
756	Toiyabe-Corbett-Haypress association	2,970	0.3
772	Booford very stony sandy loam, 8 to 15 percent slopes	600	0.1
775	Booford very stony loam, 30 to 50 percent slopes	2,960	0.3
780	Bieber stony sandy loam, 0 to 4 percent slopes	1,080	0.1
782	Bieber stony sandy loam, 8 to 15 percent slopes	495	0.1
800	Truckee silt loam	2,555	0.3
802	Truckee silt loam, strongly saline	810	0.1
805	Truckee sandy loam, gravelly substratum	1,720	0.2
806	Truckee sandy loam, sandy substratum, strongly saline	530	0.1
810	Rose Creek fine sandy loam, drained	1,590	0.2
812	Rose Creek loamy fine sand, drained	440	*
813	Rose Creek gravelly fine sandy loam, drained	505	0.1
820	Marla loamy sand, 4 to 8 percent slopes	350	*
821	Marla loamy sand, 0 to 4 percent slopes	210	*
830	Fettic silty clay loam	1,955	0.2
831	Fettic loam	350	*
840	Temo-Witefels-Rock outcrop association	4,901	0.5
850	Washoe gravelly sandy loam, 0 to 4 percent slopes	1,685	0.2
861	Reywat extremely stony loam, 15 to 30 percent slopes	1,465	0.1
862	Reywat very cobbly sandy loam, 8 to 15 percent slopes	671	0.1
863	Reywat-Rock outcrop complex, 15 to 50 percent slopes	4,937	0.5
870	Xman-Rock outcrop complex, 4 to 15 percent slopes	645	0.1
871	Xman very stony loam, 15 to 30 percent slopes	5,695	0.6
872	Xman very stony sandy loam, 8 to 15 percent slopes	1,821	0.2
873	Xman-Rock outcrop complex, 30 to 50 percent slopes	2,710	0.3
875	Xman-Zephan-Mizel association	22,008	2.2
876	Xman-Oppio-Old Camp association	16,955	1.7
877	Xman-Frodo-Mizel association	2,116	0.2
880	Zephan-Rock outcrop-Smallcone complex, 15 to 50 percent slopes	3,520	0.4
881	Zephan very gravelly sandy loam, 30 to 50 percent slopes	245	*
882	Zephan stony sandy loam, 15 to 30 percent slopes	760	0.1
890	Indiano gravelly loam, warm, 15 to 30 percent slopes	990	0.1
891	Indiano gravelly loam, warm, 30 to 50 percent slopes	2,240	0.2
892	Indiano-Koontz-Flex association	3,000	0.3
893	Indiano-Duco-Cagle association	7,390	0.7
894	Indiano-Duco-Skedaddle association	11,330	1.1
895	Indiano-Zephan-Duco association	8,145	0.8
900	Flex very gravelly sandy loam, 15 to 30 percent slopes	1,865	0.2
901	Flex very gravelly sandy loam, 30 to 50 percent slopes	4,560	0.5
903	Flex stony sandy loam, 8 to 15 percent slopes	940	0.1
910	Vamp fine sandy loam, slightly saline-alkali	1,372	0.1
911	Vamp silt loam, strongly saline-alkali	1,700	0.2
930	Old Camp stony sandy loam, 15 to 30 percent slopes	3,665	0.4
931	Old Camp-Rock outcrop complex, 15 to 50 percent slopes	6,200	0.6
932	Old Camp stony sandy loam, 8 to 15 percent slopes	825	0.1
960	Kayo stony sandy loam, 2 to 4 percent slopes	2,828	0.3
961	Kayo stony sandy loam, 4 to 8 percent slopes	5,099	0.5
962	Kayo very stony sandy loam, 4 to 8 percent slopes	2,087	0.2
963	Kayo very stony sandy loam, 15 to 30 percent slopes	639	0.1
971	Aladshi sandy loam, 2 to 4 percent slopes	4,546	0.5

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
974	Aladshi gravelly sandy loam, 4 to 8 percent slopes	1,373	0.1
980	Koontz gravelly loam, 8 to 15 percent slopes	825	0.1
982	Koontz stony loam, 15 to 30 percent slopes	2,780	0.3
990	Rock outcrop	1,710	0.2
991	Xeric Torriorthents-Urban land complex	2,900	0.3
992	Playas	3,601	0.4
993	Haplaquolls	655	0.1
994	Badland-Chalco-Verdico complex, 8 to 30 percent slopes	7,488	0.8
996	Dune land-Playas complex	5,670	0.6
997	Badland	1,810	0.2
998	Beaches	2,897	0.3
1010	Gabica very gravelly sandy loam, 8 to 30 percent slopes	810	0.1
1040	Orr Variant gravelly sandy loam	750	0.1
1041	Orr Variant coarse sandy loam, thin surface	1,285	0.1
1050	Waspo clay, 15 to 30 percent slopes	1,285	0.1
1051	Waspo stony clay, 30 to 50 percent slopes	745	0.1
1052	Waspo-Rock outcrop complex, 30 to 50 percent slopes	665	0.1
1054	Waspo gravelly clay, 2 to 8 percent slopes	1,540	0.2
1060	Witefels-Rock outcrop complex, 15 to 30 percent slopes	865	0.1
1062	Witefels-Rock outcrop complex, 50 to 70 percent slopes	270	*
1080	Inville Variant gravelly sandy loam, 2 to 8 percent slopes	545	0.1
1090	Railcity very bouldery coarse sand, 15 to 50 percent slopes	1,265	0.1
1091	Railcity very bouldery coarse sand, 8 to 15 percent slopes	695	0.1
1100	Graylock-Temo-Rock outcrop complex, 30 to 70 percent slopes	6,760	0.7
1120	Apmat very stony coarse sand, 2 to 8 percent slopes	2,205	0.2
1121	Apmat gravelly sandy loam, 2 to 8 percent slopes	785	0.1
1130	Dithod sandy loam	1,205	0.1
1141	Bedell loamy sand, 2 to 4 percent slopes	3,085	0.3
1142	Bedell loamy sand, 4 to 8 percent slopes	1,665	0.2
1143	Bedell loamy sand, 8 to 15 percent slopes	875	0.1
1160	Jowec silty clay loam	2,833	0.3
1161	Jowec sandy loam	200	*
1170	Wedertz sandy loam, 2 to 4 percent slopes	6,735	0.7
1171	Wedertz sandy loam, 4 to 8 percent slopes	4,195	0.4
1172	Wedertz sand, 2 to 4 percent slopes	4,960	0.5
1181	Haypress-Tanob-Rock outcrop complex, 15 to 50 percent slopes	2,886	0.3
1182	Haypress-Tanob-Rock outcrop association	10,930	1.1
1183	Haypress-Rock outcrop complex, 15 to 50 percent slopes	1,365	0.1
1190	Spasprey sandy loam, 0 to 2 percent slopes	680	0.1
1191	Spasprey sandy loam, 2 to 4 percent slopes	1,165	0.1
1192	Spasprey sand, 2 to 4 percent slopes	335	*
1193	Spasprey sandy loam, 4 to 8 percent slopes	655	0.1
1194	Spasprey stony sandy loam, 4 to 8 percent slopes	1,495	0.1
1200	Mellor silt loam	4,055	0.4
1210	Linhart stony coarse sand, 4 to 8 percent slopes	3,010	0.3
1211	Linhart stony coarse sand, 15 to 30 percent slopes	3,095	0.3
1220	Calpine coarse sandy loam, 4 to 8 percent slopes	230	*
1240	Pizene sandy loam, 0 to 4 percent slopes	2,720	0.3
1250	Rednik very gravelly sandy loam, 4 to 8 percent slopes	1,203	0.1
1251	Rednik very stony sandy loam, 8 to 15 percent slopes	840	0.1
1260	Thulepah-Mosquet association	5,023	0.5
1270	Tristan-Indiano-Lemm association	4,665	0.5
1271	Tristan-Barshaad-Arzo association	11,202	1.1
1272	Tristan-Arzo-Reywat association	4,036	0.4
1273	Tristan-Barshaad-Frodo association	8,800	0.9
1290	Parran silty clay loam, rarely flooded	1,030	0.1
1300	Rose Creek Variant sandy loam	405	*
1301	Rose Creek Variant loamy fine sand	1,476	0.1
1310	Bango gravelly sandy loam, 0 to 8 percent slopes	2,044	0.2
1320	Osobb-Rezave-Fireball association	45,475	4.6
1330	Sutcliff-Kleinbush-Washoe association	810	0.1
1331	Sutcliff-Bundorf-Kleinbush association	18,390	1.9
1340	Hawsley-Ruhe-Bluewing association	11,736	1.2
1341	Isolde-Dune land complex, hilly	6,336	0.6
1342	Isolde-Playas association	4,376	0.4
1344	Isolde-Toulon complex, 0 to 15 percent slopes	7,205	0.7
1345	Hawsley sand, 2 to 8 percent slopes	580	0.1
1350	Stumble-Ruhe-Bluewing association	2,574	0.3
1351	Stumble loamy sand, 4 to 8 percent slopes	2,042	0.2
1360	Trocken-Stumble-Bluewing association	4,275	0.4

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
1361	Trocken-Ruhe-Bluewing association	3,420	0.3
1362	Trocken-Badland complex, 4 to 15 percent slopes	777	0.1
1363	Trocken very stony sandy loam, 4 to 8 percent slopes	1,643	0.2
1364	Trocken-Wrango complex, 4 to 30 percent slopes	698	0.1
1370	Singatse-Fireball-Rednik association	10,010	1.0
1371	Singatse-Flex-Acrelane association	5,940	0.6
1372	Singatse-Isolde association	6,242	0.6
1373	Singatse-Mizel-Stingdorn association	6,620	0.7
1374	Singatse-Fireball-Osobb associaiton	3,041	0.3
1380	Stingdorn-Singatse-Rock outcrop association	5,312	0.5
1390	Pirouette-Osobb-Rock outcrop association	4,834	0.5
1400	Softscrabble-Gabica-Burnborough association	8,664	0.9
1401	Softscrabble-Gabica-Sumine association	21,961	2.2
1410	Burnborough-Ticino-Gabica association	2,585	0.3
1411	Burnborough-Ticino-Softscrabble association	1,810	0.2
1420	Barshaad-Fugawee-Duckhill Variant association	1,920	0.2
1430	Fraval-Booford-Jumbo association	4,689	0.5
1431	Fraval-Hirschdale-Duckhill Variant association	2,860	0.3
1432	Fraval-Hirschdale-Jumbo association	10,975	1.1
1440	Tallac very bouldery sandy loam, 4 to 30 percent slopes	5,060	0.5
1441	Tallac stony sandy loam, 30 to 50 percent slopes	975	0.1
1450	Meiss-Sibelia-Rock outcrop association	7,055	0.7
1460	Jorge-Boomtown-Fugawee association	11,525	1.2
1470	Carioca-Sibelia Variant-Fugawee association	5,710	0.6
1480	Macareeno-Blackwell-Carioca association	3,210	0.3
1490	Arzo-Indiano-Barnard association	7,009	0.7
1510	Cagle-Nosrac-Old Camp association	2,805	0.3
1520	Duco-Smallcone-Cagle association	8,267	0.8
1521	Duco-Yuko-Lemm association	3,880	0.4
1522	Duco-Pahrange-Lemm association	17,938	1.8
1530	Bombadil-Hefed-Rubble land association	10,756	1.1
1531	Bombadil-Hefed-Fireball association	3,523	0.4
1540	McQuarrie-Tristan-Arzo association	21,316	2.2
1541	McQuarrie-Duco-Tristan association	3,470	0.4
1550	Skedaddle-Pahrange-Lemm association	10,111	1.0
1570	Bluewing-Biddleman-Bundorf association	2,705	0.3
1580	Frodo-Xman-Oppio association	14,980	1.5
1590	Ruhe stony loamy sand, 4 to 8 percent slopes	1,398	0.1
1600	Wrango-Ruhe complex, 4 to 8 percent slopes	1,549	0.2
	Water areas smaller than 40 acres	1,415	0.1
	Water areas larger than 40 acres	42,050	4.3
	Total	1,028,620	100.0

* Less than 0.1 percent.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

[Only the soils that support rangeland vegetation suitable for grazing are listed. Soils in areas undergoing rapid development for nonagricultural uses are not included]

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
140, 141, 142------ Haybourne	Sandy, 8-10" p.z. (26-20)-----	Favorable	800	Needleandthread---------------	20
		Normal	600	Indian ricegrass--------------	15
		Unfavorable	400	Wyoming big sagebrush---------	15
				Thurber needlegrass-----------	10
				Bottlebrush squirreltail------	10
160---------------- Incy	Sandy, 8-10" p.z. (26-20)-----	Favorable	800	Needleandthread---------------	20
		Normal	600	Wyoming big sagebrush---------	15
		Unfavorable	400	Thurber needlegrass-----------	15
				Spiny hopsage-----------------	5
				Desert needlegrass------------	5
				Antelope bitterbrush----------	5
				Bottlebrush squirreltail------	5
161---------------- Incy	Dunes, 10-12" p.z. (26-14)----	Favorable	800	Needleandthread---------------	25
		Normal	700	Antelope bitterbrush----------	25
		Unfavorable	600	Indian ricegrass--------------	15
				Desert needlegrass------------	5
				Wyoming big sagebrush---------	5
				Rubber rabbitbrush------------	5
				Spiny hopsage-----------------	5
				Green ephedra-----------------	5
174, 175----------- Indian Creek	Claypan, 8-10" p.z. (26-25)---	Favorable	400	Thurber needlegrass-----------	25
		Normal	300	Low sagebrush-----------------	20
		Unfavorable	200	Bottlebrush squirreltail------	15
				Sandberg bluegrass------------	10
				Littleleaf horsebrush---------	5
176*:					
Indian Creek------	Claypan, 8-10" p.z. (26-25)---	Favorable	400	Thurber needlegrass-----------	25
		Normal	300	Low sagebrush-----------------	20
		Unfavorable	200	Bottlebrush squirreltail------	15
				Sandberg bluegrass------------	10
				Littleleaf horsebrush---------	5
Reno--------------	Claypan, 10-12" p.z. (26-23)--	Favorable	400	Thurber needlegrass-----------	25
		Normal	300	Low sagebrush-----------------	20
		Unfavorable	200	Bottlebrush squirreltail------	10
				Canby bluegrass---------------	10
				Sandberg bluegrass------------	5
				Littleleaf horsebrush---------	5
Washoe------------	Loamy, 8-10" p.z. (26-16)-----	Favorable	800	Thurber needlegrass-----------	20
		Normal	500	Wyoming big sagebrush---------	20
		Unfavorable	400	Indian ricegrass--------------	10
				Anderson peachbrush-----------	5
				Bottlebrush squirreltail------	5
				Green ephedra-----------------	5
				Douglas rabbitbrush-----------	5
190, 191, 192------ Manogue	Churning Clay, 8-10" p.z. (26-27)	Favorable	400	Bottlebrush squirreltail------	40
		Normal	300	Sandberg bluegrass------------	10
		Unfavorable	200	Littleleaf horsebrush---------	10
				Douglas rabbitbrush-----------	10
				Low sagebrush-----------------	10
				Sunflower---------------------	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
210, 211-----------Luppino	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	500	Indian ricegrass	10
				Antelope bitterbrush	10
				Basin wildrye	5
				Douglas rabbitbrush	5
				Western juniper	5
221, 222-----------Oppio	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
223*:					
Oppio	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Rezave	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	25
		Normal	200	Shadscale	20
		Unfavorable	50	Bailey greasewood	10
				Bud sagebrush	10
				Galleta	5
				Bottlebrush squirreltail	5
Rock outcrop.					
230-----------Cradlebaugh	Moist Floodplain (26-1)	Favorable	4,000	Creeping wildrye	50
		Normal	2,500	Basin wildrye	15
		Unfavorable	1,200	Nevada bluegrass	5
				Baltic rush	5
250, 251, 252------Cassiro	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
280, 281, 282------Wedekind	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	15
		Unfavorable	450	Wyoming big sagebrush	15
				Indian ricegrass	10
				Antelope bitterbrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
290, 291-----------Verdico Variant	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	20
		Normal	400	Low sagebrush	20
		Unfavorable	300	Canby bluegrass	10
				Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
310*, 311*:					
Risley	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	500	Indian ricegrass	10
				Antelope bitterbrush	10
				Basin wildrye	5
				Douglas rabbitbrush	5
				Western juniper	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo- sition
			Lb/acre		Pct
310*, 311*:					
Rock outcrop.					
312, 313----------- Risley	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass-----------	20
		Normal	600	Wyoming big sagebrush---------	20
		Unfavorable	500	Indian ricegrass--------------	10
				Antelope bitterbrush----------	10
				Basin wildrye-----------------	5
				Douglas rabbitbrush-----------	5
				Western juniper---------------	5
314*:					
Risley------------	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass-----------	20
		Normal	600	Wyoming big sagebrush---------	20
		Unfavorable	500	Indian ricegrass--------------	10
				Antelope bitterbrush----------	10
				Basin wildrye-----------------	5
				Douglas rabbitbrush-----------	5
				Western juniper---------------	5
Xman--------------	Claypan, 8-10" p.z. (26-25)---	Favorable	400	Thurber needlegrass-----------	25
		Normal	300	Low sagebrush-----------------	20
		Unfavorable	200	Bottlebrush squirreltail------	15
				Sandberg bluegrass------------	10
				Littleleaf horsebrush---------	5
Rock outcrop.					
341--------------- Yuko	South Slope, 8-12" p.z. (26-11)	Favorable	800	Desert needlegrass------------	30
		Normal	700	Thurber needlegrass-----------	10
		Unfavorable	600	Green ephedra-----------------	10
				Wyoming big sagebrush---------	10
				Bottlebrush squirreltail------	5
				Sandberg bluegrass------------	5
				Littleleaf horsebrush---------	5
				Douglas rabbitbrush-----------	5
342*:					
Yuko--------------	South Slope, 8-12" p.z. (26-11)	Favorable	800	Desert needlegrass------------	30
		Normal	700	Thurber needlegrass-----------	10
		Unfavorable	600	Green ephedra-----------------	10
				Wyoming big sagebrush---------	10
				Bottlebrush squirreltail------	5
				Sandberg bluegrass------------	5
				Littleleaf horsebrush---------	5
				Douglas rabbitbrush-----------	5
Reywat------------	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass-----------	20
		Normal	600	Bottlebrush squirreltail------	10
		Unfavorable	450	Indian ricegrass--------------	10
				Arrowleaf balsamroot----------	5
				Wyoming big sagebrush---------	5
Rock outcrop.					
351*:					
Mizel-------------	Eroded Slopes, 8-12" p.z. (26-29)	Favorable	200	Wyoming big sagebrush---------	20
		Normal	150	Desert needlegrass------------	15
		Unfavorable	100	Indian ricegrass--------------	10
				Douglas rabbitbrush-----------	10
				Purple sage-------------------	10
				Antelope bitterbrush----------	10
				Bottlebrush squirreltail------	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
351*:					
Skedaddle	Eroded South Slopes, 8-10" p.z. (23-30)	Favorable	300	Purple sage	20
		Normal	200	Desert needlegrass	10
		Unfavorable	150	Antelope bitterbrush	10
				Green ephedra	10
				Bottlebrush squirreltail	5
				Littleleaf horsebrush	5
				Wyoming big sagebrush	5
Rock outcrop.					
490 Graufels	Granitic Upland, 10-12" p.z. (26-26)	Favorable	800	Wyoming big sagebrush	20
		Normal	600	Anderson peachbrush	15
		Unfavorable	400	Wyoming big sagebrush	15
				Indian ricegrass	10
				Thurber needlegrass	10
				Phlox	5
				Anderson peachbrush	5
491*:					
Graufels	Granitic Upland, 10-12" p.z. (26-26)	Favorable	800	Wyoming big sagebrush	20
		Normal	600	Anderson peachbrush	15
		Unfavorable	400	Wyoming big sagebrush	15
				Indian ricegrass	10
				Thurber needlegrass	10
				Phlox	5
				Anderson peachbrush	5
Rock outcrop.					
492 Graufels	Granitic Upland, 10-12" p.z. (26-26)	Favorable	800	Wyoming big sagebrush	20
		Normal	600	Anderson peachbrush	15
		Unfavorable	400	Wyoming big sagebrush	15
				Indian ricegrass	10
				Thurber needlegrass	10
				Phlox	5
				Anderson peachbrush	5
493*:					
Graufels	Granitic Upland, 10-12" p.z. (26-26)	Favorable	800	Wyoming big sagebrush	20
		Normal	600	Anderson peachbrush	15
		Unfavorable	400	Wyoming big sagebrush	15
				Indian ricegrass	10
				Thurber needlegrass	10
				Phlox	5
				Anderson peachbrush	5
Glenbrook	Shallow Granitic-Upland, 10-12" p.z. (26-18)	Favorable	650	Desert needlegrass	30
		Normal	400	Antelope bitterbrush	15
		Unfavorable	250	Thurber needlegrass	10
				Bottlebrush squirreltail	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
494 Graufels	Granitic Upland, 10-12" p.z. (26-26)	Favorable	800	Wyoming big sagebrush	20
		Normal	600	Anderson peachbrush	15
		Unfavorable	400	Wyoming big sagebrush	15
				Indian ricegrass	10
				Thurber needlegrass	10
				Phlox	5
				Anderson peachbrush	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
495*:					
Graufels	Granitic Upland, 10-12" p.z. (26-26)	Favorable	800	Wyoming big sagebrush	20
		Normal	600	Anderson peachbrush	15
		Unfavorable	400	Wyoming big sagebrush	15
				Indian ricegrass	10
				Thurber needlegrass	10
				Phlox	5
				Anderson peachbrush	5
Glenbrook	Shallow Granitic-Upland, 10-12" p.z. (26-18)	Favorable	650	Desert needlegrass	30
		Normal	400	Antelope bitterbrush	15
		Unfavorable	250	Thurber needlegrass	10
				Bottlebrush squirreltail	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
Rock outcrop.					
496*:					
Graufels	Granitic Upland, 10-12" p.z. (26-26)	Favorable	800	Wyoming big sagebrush	20
		Normal	600	Anderson peachbrush	15
		Unfavorable	400	Wyoming big sagebrush	15
				Indian ricegrass	10
				Thurber needlegrass	10
				Phlox	5
				Anderson peachbrush	5
Glenbrook	Shallow Granitic-Upland, 10-12" p.z. (26-6)	Favorable	650	Desert needlegrass	30
		Normal	400	Antelope bitterbrush	15
		Unfavorable	250	Thurber needlegrass	10
				Bottlebrush squirreltail	10
				Wyoming big sagebrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
Haypress	Granitic Upland, 14-16" p.z. (26-26)	Favorable	1,000	Thurber needlegrass	30
		Normal	900	Indian ricegrass	20
		Unfavorable	800	Big sagebrush	15
				Pricklygilia	7
513*:					
Settlemeyer	Wet Meadow (26-3)	Favorable	2,000	Tufted hairgrass	30
		Normal	1,500	Nevada bluegrass	15
		Unfavorable	1,000	Meadow barley	10
				Alpine timothy	10
				Cinquefoil	5
				Willow	5
Notus	Loamy Bottom, 8-10" p.z. (23-9)	Favorable	3,000	Basin wildrye	60
		Normal	2,000	Big sagebrush	15
		Unfavorable	1,500	Nevada bluegrass	10
				Sedge	5
				Tall green rabbitbrush	5
550, 551, 553, 554, 557, 559 Leviathan	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
570: Turria	Loamy, 8-10" p.z. (26-16)	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Bottlebrush squirreltail	5
				Anderson peachbrush	5
				Green ephedra	5
				Douglas rabbitbrush	5
585*:					
Barnard	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Wyoming big sagebrush	20
		Normal	600	Thurber needlegrass	20
		Unfavorable	500	Antelope bitterbrush	10
				Indian ricegrass	10
				Western juniper	5
				Utah juniper	5
Trosi	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	20
		Unfavorable	300	Canby bluegrass	10
				Antelope bitterbrush	5
590, 591, 595: Springmeyer	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
612, 613, 615: Verdico	Claypan, 10-12" p.z. (26-23)	Favorable	400	Low sagebrush	20
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Littleleaf horsebrush	5
				Canby bluegrass	5
				Sandberg bluegrass	5
620, 621: Orr	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
660, 661, 662: Oest	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
663, 664: Oest	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
668: Oest	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo- sition
			Lb/acre		Pct
669 Oest	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
670, 671, 673 Galeppi	Loamy, 10-12" p.z. (26-10)	Favorable	900	Wyoming big sagebrush	20
		Normal	700	Thurber needlegrass	20
		Unfavorable	600	Antelope bitterbrush	10
				Basin wildrye	10
674 Galeppi	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Wyoming big sagebrush	20
		Normal	600	Thurber needlegrass	15
		Unfavorable	500	Antelope bitterbrush	10
				Utah juniper	5
				Douglas rabbitbrush	5
				Indian ricegrass	5
				Western juniper	5
676*:					
Galeppi	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	900	Wyoming big sagebrush	20
		Normal	700	Thurber needlegrass	20
		Unfavorable	600	Antelope bitterbrush	10
				Basin wildrye	10
Barnard	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Wyoming big sagebrush	20
		Normal	600	Thurber needlegrass	20
		Unfavorable	500	Antelope bitterbrush	10
				Indian ricegrass	10
				Western juniper	5
				Utah juniper	5
681, 683 Reno	Claypan, 10-12" p.z. (26-23)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Canby bluegrass	10
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
730, 731 Stodick	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	15
		Unfavorable	450	Wyoming big sagebrush	15
				Indian ricegrass	10
				Antelope bitterbrush	10
				Douglas rabbitbrush	5
				Green ephedra	5
740 Blackwell	Wet Meadow (22-1)	Favorable	2,000	Nevada bluegrass	20
		Normal	1,500	Sedge	10
		Unfavorable	1,000	Willow	5
772, 775 Booford	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	25
		Normal	1,050	Mountain brome	20
		Unfavorable	900	Basin wildrye	15
				Mountain big sagebrush	15
				Big sagebrush	10
780, 782 Bieber	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	20
		Unfavorable	300	Bottlebrush squirreltail	15
				Canby bluegrass	10
				Antelope bitterbrush	5
				Douglas rabbitbrush	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
850: Washoe	Loamy, 8-10" p.z. (26-16)	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Anderson peachbrush	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Douglas rabbitbrush	5
861, 862: Reywat	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	10
		Unfavorable	450	Indian ricegrass	10
				Arrowleaf balsamroot	5
				Wyoming big sagebrush	5
863*: Reywat	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	10
		Unfavorable	450	Indian ricegrass	10
				Arrowleaf balsamroot	5
				Wyoming big sagebrush	5
Rock outcrop.					
870*: Xman	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Rock outcrop.					
871, 872: Xman	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
873*: Xman	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Rock outcrop.					
875*: Xman	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Zephan	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	500	Indian ricegrass	10
				Antelope bitterbrush	10
				Basin wildrye	5
				Douglas rabbitbrush	5
				Western juniper	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo-sition
			Lb/acre		Pct
875*:					
Mizel	Eroded Slopes, 8-12" p.z. (26-29)	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Indian ricegrass	10
				Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
876*:					
Xman	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Oppio	Claypan, 8-10" p.z. (26-25)	Favorable	400	Low sagebrush	20
		Normal	300	Thurber needlegrass	20
		Unfavorable	200	Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Old Camp	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass	25
		Normal	450	Wyoming big sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Green ephedra	10
				Thurber needlegrass	5
				Douglas rabbitbrush	5
				Spiny hopsage	5
877*:					
Xman	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Frodo	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Canby bluegrass	10
				Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Mizel	Eroded Slopes, 8-12" p.z. (26-29)	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Indian ricegrass	10
				Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
880*:					
Zephan	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	500	Indian ricegrass	10
				Antelope bitterbrush	10
				Basin wildrye	5
				Douglas rabbitbrush	5
				Western juniper	5
Rock outcrop.					
Smallcone.					

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
890: Indiano	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
891: Indiano	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
892*:					
Indiano	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
Koontz	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	15
		Unfavorable	450	Wyoming big sagebrush	15
				Indian ricegrass	10
				Antelope bitterbrush	10
				Green ephedra	5
				Douglas rabbitbrush	5
Flex	South Slope, 8-12" p.z. (26-11)	Favorable	800	Desert needlegrass	40
		Normal	700	Thurber needlegrass	15
		Unfavorable	600	Wyoming big sagebrush	10
				Green ephedra	10
				Douglas rabbitbrush	5
				Bottlebrush squirreltail	5
893*:					
Indiano	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
Duco.					
Cagle	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Antelope bitterbrush	10
				Basin wildrye	5
				Bottlebrush squirreltail	5
894*:					
Indiano	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Indian ricegrass	5
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
Duco.					

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
894*:					
Skedaddle	Eroded South Slopes, 8-10" p.z. (23-30)	Favorable	300	Purple sage	20
		Normal	200	Desert needlegrass	10
		Unfavorable	150	Antelope bitterbrush	10
				Green ephedra	10
				Bottlebrush squirreltail	5
				Littleleaf horsebrush	5
				Wyoming big sagebrush	5
895*:					
Indiano	Loamy, 10-12" p.z. (23-20)	Favorable	1,100	Bluebunch wheatgrass	40
		Normal	800	Wyoming big sagebrush	20
		Unfavorable	600	Thurber needlegrass	10
				Antelope bitterbrush	10
				Basin wildrye	5
Zephan	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	500	Indian ricegrass	10
				Antelope bitterbrush	10
				Basin wildrye	5
				Douglas rabbitbrush	5
				Western juniper	5
Duco.					
900, 901, 903 Flex	South Slope, 8-12" p.z. (26-11)	Favorable	800	Desert needlegrass	40
		Normal	700	Thurber needlegrass	15
		Unfavorable	600	Wyoming big sagebrush	10
				Green ephedra	10
				Douglas rabbitbrush	5
				Bottlebrush squirreltail	5
930 Old Camp	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass	25
		Normal	450	Wyoming big sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Green ephedra	10
				Thurber needlegrass	5
				Douglas rabbitbrush	5
				Spiny hopsage	5
931*:					
Old Camp	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass	25
		Normal	450	Wyoming big sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Green ephedra	10
				Thurber needlegrass	5
				Douglas rabbitbrush	5
				Spiny hopsage	5
Rock outcrop.					
932 Old Camp	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass	25
		Normal	450	Wyoming big sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Green ephedra	10
				Thurber needlegrass	5
				Douglas rabbitbrush	5
				Spiny hopsage	5
960 Kayo	Droughty Loam, 8-10" p.z. (26-24)	Favorable	400	Wyoming big sagebrush	30
		Normal	300	Spiny hopsage	20
		Unfavorable	200	Indian ricegrass	15
				Desert needlegrass	5
				Douglas rabbitbrush	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo-sition
			Lb/acre		Pct
961, 962, 963: Kayo	Droughty Loam, 8-10" p.z. (26-24)	Favorable	400	Wyoming big sagebrush	30
		Normal	300	Spiny hopsage	20
		Unfavorable	200	Indian ricegrass	15
				Desert needlegrass	5
				Douglas rabbitbrush	5
971, 974: Aladshi	Droughty Loam, 8-10" p.z. (26-24)	Favorable	400	Wyoming big sagebrush	30
		Normal	300	Spiny hopsage	25
		Unfavorable	200	Indian ricegrass	15
				Desert needlegrass	5
980: Koontz	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	15
		Unfavorable	450	Wyoming big sagebrush	15
				Indian ricegrass	10
				Antelope bitterbrush	10
				Douglas rabbitbrush	5
982: Koontz	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	15
		Unfavorable	450	Wyoming big sagebrush	15
				Indian ricegrass	10
				Antelope bitterbrush	10
				Green ephedra	5
				Douglas rabbitbrush	5
1010: Gabica	Mountain Ridges, 12-16" p.z. (26-28)	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Sedge	5
				Rabbitbrush	5
				Antelope bitterbrush	5
1050, 1051: Waspo	Churning Clay, 10-12" p.z. (26-19)	Favorable	800	Western wheatgrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	500	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	10
				Onion	5
				Antelope bitterbrush	5
1052*:					
Waspo	Churning Clay, 10-12" p.z. (26-19)	Favorable	800	Western wheatgrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	500	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	10
				Onion	5
				Antelope bitterbrush	5
Rock outcrop.					
1054: Waspo	Churning Clay, 10-12" p.z. (26-19)	Favorable	800	Western wheatgrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	500	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	10
				Onion	5
				Antelope bitterbrush	5
1141, 1142, 1143: Bedell	Granitic Fan, 10-12" p.z. (26-8)	Favorable	1,000	Needleandthread	20
		Normal	800	Antelope bitterbrush	20
		Unfavorable	600	Indian ricegrass	15
				Mountain big sagebrush	10
				Desert needlegrass	5
				Bottlebrush squirreltail	5
				Spineless horsebrush	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1170, 1171 Wedertz	Loamy, 8-10" p.z. (26-16)	Favorable	800	Thurber needlegrass	25
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Anderson peachbrush	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Douglas rabbitbrush	5
1172 Wedertz	Sandy, 8-10" p.z. (26-20)	Favorable	800	Needleandthread	20
		Normal	600	Indian ricegrass	20
		Unfavorable	400	Wyoming big sagebrush	15
				Bottlebrush squirreltail	10
				Thurber needlegrass	5
1181*, 1182*:					
Haypress	Granitic Upland, 14-16" p.z. (26-6)	Favorable	1,000	Thurber needlegrass	30
		Normal	900	Indian ricegrass	20
		Unfavorable	800	Big sagebrush	15
				Pricklygilia	7
Tanob	Granitic Upland, 14-16" p.z. (26-6)	Favorable	1,000	Thurber needlegrass	15
		Normal	900	California needlegrass	10
		Unfavorable	800	Mountain big sagebrush	10
				Antelope bitterbrush	10
				Mountain brome	5
				Snowberry	5
Rock outcrop.					
1190, 1191, 1192, 1193, 1194 Spasprey	Loamy, 8-10" p.z. (26-16)	Favorable	800	Thurber needlegrass	20
		Normal	600	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Green ephedra	5
				Bottlebrush squirreltail	5
				Douglas rabbitbrush	5
				Anderson peachbrush	5
1210, 1211 Linhart	Granitic Fan, 10-12" p.z. (26-8)	Favorable	1,000	Needleandthread	20
		Normal	800	Antelope bitterbrush	20
		Unfavorable	600	Indian ricegrass	15
				Mountain big sagebrush	10
				Desert needlegrass	5
				Bottlebrush squirreltail	5
				Spineless horsebrush	5
1220 Calpine	Granitic Fan, 10-12" p.z. (26-8)	Favorable	1,000	Needleandthread	20
		Normal	800	Antelope bitterbrush	15
		Unfavorable	600	Big sagebrush	10
				Indian ricegrass	10
				Desert needlegrass	5
				Thurber needlegrass	5
1250, 1251 Rednik	Loamy, 6-8" p.z. (27-13)	Favorable	500	Shadscale	35
		Normal	300	Indian ricegrass	20
		Unfavorable	200	Bud sagebrush	20
				Bottlebrush squirreltail	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1260*:					
Thulepah	Steep North Slope, 14-20" p.z. (26-7)	Favorable	1,000	Idaho fescue	30
		Normal	800	Mountain big sagebrush	10
		Unfavorable	600	Mountain brome	5
				Bluebunch wheatgrass	5
				Nevada bluegrass	5
				Antelope bitterbrush	5
				Snowberry	5
Mosquet	Mountain Ridges, 12-16" p.z. (26-28)	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Sedge	5
				Phlox	5
				Rabbitbrush	5
				Antelope bitterbrush	5
1270*:					
Tristan	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
Indiano	Loamy, 10-12" p.z. (23-20)	Favorable	1,100	Bluebunch wheatgrass	40
		Normal	800	Wyoming big sagebrush	20
		Unfavorable	600	Thurber needlegrass	10
				Basin wildrye	5
Lemm	Loamy, 10-12" p.z. (23-20)	Favorable	1,100	Bluebunch wheatgrass	35
		Normal	800	Wyoming big sagebrush	20
		Unfavorable	600	Thurber needlegrass	15
				Basin wildrye	5
				Sandberg bluegrass	5
1271*:					
Tristan	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
Barshaad	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Canby bluegrass	10
				Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Arzo	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
1272*:					
Tristan	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1272*:					
Arzo	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
Reywat	Shallow Loam, 10-12" p.z. (26-15)	Favorable	700	Thurber needlegrass	20
		Normal	600	Bottlebrush squirreltail	10
		Unfavorable	450	Indian ricegrass	10
				Arrowleaf balsamroot	5
				Wyoming big sagebrush	5
1273*:					
Tristan	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
Barshaad	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Canby bluegrass	10
				Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Frodo	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Canby bluegrass	10
				Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
1290 Parran	Wet Sodic Bottom (26-2)	Favorable	2,000	Inland saltgrass	60
		Normal	1,800	Seepweed	5
		Unfavorable	1,700	Black greasewood	5
1310 Bango	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	50	Bottlebrush squirreltail	10
				Bailey greasewood	10
				Bud sagebrush	10
1320*:					
Osobb	Eroded Slope, 4-8" p.z. (27-26)	Favorable	250	Indian ricegrass	20
		Normal	100	Shadscale	20
		Unfavorable	50	Desert needlegrass	10
				Bailey greasewood	10
				Winterfat	5
				Nevada ephedra	5
				Douglas rabbitbrush	5
Rezave	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	50	Bailey greasewood	10
				Bottlebrush squirreltail	10
				Bud sagebrush	10

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1320*:					
Fireball	Gravelly Loam, 6-8" p.z. (27-30)	Favorable	400	Pine bluegrass	20
		Normal	300	Indian ricegrass	15
		Unfavorable	200	Shadscale	15
				Bailey greasewood	10
				Bud sagebrush	10
				Bottlebrush squirreltail	5
1330*:					
Sutcliff	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	100	Bailey greasewood	10
				Bud sagebrush	10
				Bottlebrush squirreltail	5
Kleinbush	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	300	Shadscale	20
		Unfavorable	200	Bud sagebrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
Washoe	Loamy, 8-10" p.z. (26-16)	Favorable	800	Thurber needlegrass	20
		Normal	500	Wyoming big sagebrush	20
		Unfavorable	400	Indian ricegrass	10
				Anderson peachbrush	5
				Bottlebrush squirreltail	5
				Green ephedra	5
				Douglas rabbitbrush	5
1331*:					
Sutcliff	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	100	Bailey greasewood	10
				Bud sagebrush	10
				Bottlebrush squirreltail	5
Bundorf	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	300	Shadscale	20
		Unfavorable	200	Bud sagebrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
Kleinbush	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	300	Shadscale	20
		Unfavorable	200	Bud sagebrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
1340*:					
Hawsley	Sandy, 4-8" p.z. (27-9)	Favorable	500	Indian ricegrass	40
		Normal	300	Needleandthread	10
		Unfavorable	200	Bailey greasewood	10
				Galleta	5
				Bud sagebrush	5
				Shadscale	5
				Winterfat	5
				Fourwing saltbush	5
Ruhe	Sandy, 4-8" p.z. (27-9)	Favorable	500	Indian ricegrass	40
		Normal	300	Needleandthread	10
		Unfavorable	200	Bailey greasewood	10
				Galleta	5
				Bud sagebrush	5
				Shadscale	5
				Winterfat	5
				Fourwing saltbush	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1340*:					
Bluewing	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	100	Bailey greasewood	10
				Bud sagebrush	5
1341*:					
Isolde	Dunes, 4-8" p.z. (27-23)	Favorable	300	Hairy horsebrush	30
		Normal	200	Indian ricegrass	20
		Unfavorable	100	Needleandthread	10
				Fourwing saltbush	10
				Nevada dalea	5
				Littleleaf horsebrush	5
Dune land.					
1342*:					
Isolde	Dunes, 4-8" p.z. (27-23)	Favorable	300	Hairy horsebrush	30
		Normal	200	Indian ricegrass	20
		Unfavorable	100	Needleandthread	10
				Fourwing saltbush	10
				Nevada dalea	5
				Littleleaf horsebrush	5
Playas.					
1344*:					
Isolde	Dunes, 4-8" p.z. (27-23)	Favorable	300	Hairy horsebrush	30
		Normal	200	Indian ricegrass	20
		Unfavorable	100	Needleandthread	10
				Fourwing saltbush	10
				Nevada dalea	5
				Littleleaf horsebrush	5
Toulon	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	300	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	100	Bailey greasewood	10
				Bottlebrush squirreltail	10
				Bud sagebrush	5
1345 Hawsley	Sandy, 4-8" p.z. (27-9)	Favorable	500	Indian ricegrass	40
		Normal	300	Needleandthread	10
		Unfavorable	200	Bailey greasewood	10
				Galleta	5
				Bud sagebrush	5
				Shadscale	5
				Winterfat	5
				Fourwing saltbush	5
1350*:					
Stumble	Sandy, 4-8" p.z. (27-9)	Favorable	500	Indian ricegrass	40
		Normal	300	Bailey greasewood	10
		Unfavorable	200	Needleandthread	10
				Fourwing saltbush	5
				Winterfat	5
				Galleta	5
Ruhe	Sandy, 4-8" p.z. (27-9)	Favorable	500	Indian ricegrass	40
		Normal	300	Needleandthread	10
		Unfavorable	200	Bailey greasewood	10
				Galleta	5
				Bud sagebrush	5
				Shadscale	5
				Winterfat	5
				Fourwing saltbush	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo-sition
			Lb/acre		Pct
1350*:					
Bluewing	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	100	Bailey greasewood	10
				Bud sagebrush	10
1351 Stumble	Sandy, 4-8" p.z. (27-9)	Favorable	500	Indian ricegrass	40
		Normal	300	Bailey greasewood	10
		Unfavorable	200	Needleandthread	10
				Fourwing saltbush	5
				Winterfat	5
				Galleta	5
1360*:					
Trocken	Loamy, 6-8" p.z. (27-13)	Favorable	500	Shadscale	25
		Normal	300	Indian ricegrass	25
		Unfavorable	200	Bud sagebrush	15
				Bottlebrush squirreltail	10
				Winterfat	5
Stumble	Sandy, 4-8" p.z. (27-9)	Favorable	500	Indian ricegrass	40
		Normal	300	Bailey greasewood	10
		Unfavorable	200	Needleandthread	10
				Fourwing saltbush	5
				Winterfat	5
				Galleta	5
Bluewing	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	100	Bailey greasewood	10
				Bud sagebrush	10
1361*:					
Trocken	Loamy, 6-8" p.z. (27-13)	Favorable	500	Shadscale	25
		Normal	300	Indian ricegrass	25
		Unfavorable	200	Bud sagebrush	15
				Bottlebrush squirreltail	10
				Winterfat	5
Ruhe	Sandy, 4-8" p.z. (27-9)	Favorable	500	Indian ricegrass	40
		Normal	300	Needleandthread	10
		Unfavorable	200	Bailey greasewood	10
				Galleta	5
				Bud sagebrush	5
				Shadscale	5
				Winterfat	5
				Fourwing saltbush	5
Bluewing	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	20
		Unfavorable	100	Bailey greasewood	10
				Bud sagebrush	10
1362*:					
Trocken	Loamy, 6-8" p.z. (27-13)	Favorable	500	Shadscale	25
		Normal	300	Indian ricegrass	15
		Unfavorable	200	Bud sagebrush	15
				Bottlebrush squirreltail	10
				Winterfat	5
Badland.					
1363 Trocken	Loamy, 6-8" p.z. (27-13)	Favorable	500	Shadscale	25
		Normal	300	Indian ricegrass	25
		Unfavorable	200	Bud sagebrush	15
				Bottlebrush squirreltail	10
				Winterfat	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo-sition
			Lb/acre		Pct
1364*:					
Trocken	Loamy, 6-8" p.z. (27-13)	Favorable	500	Shadscale	25
		Normal	300	Indian ricegrass	25
		Unfavorable	200	Bud sagebrush	15
				Bottlebrush squirreltail	10
				Winterfat	5
Wrango	Droughty Loam, 8-10" p.z. (26-24)	Favorable	400	Wyoming big sagebrush	35
		Normal	300	Spiny hopsage	25
		Unfavorable	200	Indian ricegrass	10
1370*:					
Singatse	Very Shallow Loam, 4-8" p.z. (27-27)	Favorable	150	Indian ricegrass	25
		Normal	100	Shadscale	20
		Unfavorable	50	Desert needlegrass	15
				Galleta	5
				Bottlebrush squirreltail	5
				Winterfat	5
				Bud sagebrush	5
Fireball	Gravelly Loam, 4-6" p.z. (27-30)	Favorable	400	Pine bluegrass	20
		Normal	200	Shadscale	15
		Unfavorable	50	Bailey greasewood	10
				Bud sagebrush	10
				Bottlebrush squirreltail	5
Rednik	Loamy, 6-8" p.z. (27-13)	Favorable	500	Shadscale	25
		Normal	300	Indian ricegrass	20
		Unfavorable	200	Bud sagebrush	20
				Bottlebrush squirreltail	5
1371*:					
Singatse	Very Shallow Loam, 4-8" p.z. (27-27)	Favorable	150	Indian ricegrass	25
		Normal	100	Shadscale	20
		Unfavorable	50	Desert needlegrass	15
				Galleta	5
				Bottlebrush squirreltail	5
				Winterfat	5
				Bud sagebrush	5
Flex	South Slope, 8-10" p.z. (26-11)	Favorable	800	Desert needlegrass	40
		Normal	700	Thurber needlegrass	15
		Unfavorable	600	Wyoming big sagebrush	10
				Green ephedra	10
				Douglas rabbitbrush	5
				Bottlebrush squirreltail	5
Acrelane.					
1372*:					
Singatse	Very Shallow Loam, 4-8" p.z. (27-27)	Favorable	150	Indian ricegrass	25
		Normal	100	Shadscale	20
		Unfavorable	50	Desert needlegrass	15
				Galleta	5
				Bottlebrush squirreltail	5
				Winterfat	5
				Bud sagebrush	5
Isolde	Dunes 4-8" p.z. (27-23)	Favorable	300	Hairy horsebrush	30
		Normal	200	Indian ricegrass	20
		Unfavorable	100	Needleandthread	10
				Fourwing saltbush	10
				Nevada dalea	5
				Littleleaf horsebrush	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1373*:					
Singatse	Very Shallow Loam, 4-8" p.z. (27-27)	Favorable	150	Indian ricegrass	25
		Normal	100	Shadscale	20
		Unfavorable	50	Desert needlegrass	15
				Galleta	5
				Bottlebrush squirreltail	5
				Winterfat	5
				Bud sagebrush	5
Mizel	Eroded Slopes, 8-12" p.z. (26-29)	Favorable	200	Wyoming big sagebrush	20
		Normal	150	Desert needlegrass	15
		Unfavorable	100	Indian ricegrass	10
				Douglas rabbitbrush	10
				Purple sage	10
				Antelope bitterbrush	10
				Bottlebrush squirreltail	5
Stingdorn	Eroded Slope, 4-8" p.z. (27-26)	Favorable	250	Indian ricegrass	20
		Normal	100	Bailey greasewood	20
		Unfavorable	50	Shadscale	20
				Desert needlegrass	10
				Winterfat	5
1374*:					
Singatse	Very Shallow Loam, 4-8" p.z. (27-27)	Favorable	150	Indian ricegrass	25
		Normal	100	Shadscale	20
		Unfavorable	50	Desert needlegrass	15
				Galleta	5
				Bottlebrush squirreltail	5
				Winterfat	5
				Bud sagebrush	5
Fireball	Gravelly Loam, 6-8" p.z. (27-30)	Favorable	400	Pine bluegrass	20
		Normal	200	Shadscale	15
		Unfavorable	50	Bailey greasewood	10
				Bud sagebrush	10
				Bottlebrush squirreltail	5
Osobb	Eroded Slope, 4-8" p.z. (27-26)	Favorable	250	Indian ricegrass	20
		Normal	100	Shadscale	20
		Unfavorable	50	Bailey greasewood	10
				Desert needlegrass	10
				Winterfat	5
				Nevada ephedra	5
				Douglas rabbitbrush	5
1380*:					
Stingdorn	Eroded Slope, 4-6" p.z. (27-26)	Favorable	250	Indian ricegrass	20
		Normal	100	Shadscale	20
		Unfavorable	50	Bailey greasewood	10
				Desert needlegrass	10
				Winterfat	5
Singatse	Very Shallow Loam, 4-8" p.z. (27-27)	Favorable	250	Indian ricegrass	20
		Normal	100	Shadscale	20
		Unfavorable	50	Desert needlegrass	10
				Winterfat	5
				Galleta	5
				Bottlebrush squirreltail	5
				Bud sagebrush	5
Rock outcrop.					

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1390*:					
Pirouette	Gravelly Loam, 4-8" p.z. (27-18)	Favorable	400	Indian ricegrass	30
		Normal	200	Shadscale	15
		Unfavorable	100	Bailey greasewood	10
				Pine bluegrass	5
				Bottlebrush squirreltail	5
				Bud sagebrush	5
Osobb	Eroded Slope, 4-8" p.z. (27-26)	Favorable	250	Indian ricegrass	20
		Normal	100	Shadscale	20
		Unfavorable	50	Bailey greasewood	10
				Desert needlegrass	10
				Winterfat	5
				Nevada ephedra	5
				Douglas rabbitbrush	5
Rock outcrop.					
1400*:					
Softscrabble	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Spike-fescue	5
				Snowberry	5
				Serviceberry	5
Gabica	Mountain Ridges, 12-16" p.z. (26-28)	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Sedge	5
				Rabbitbrush	5
				Antelope bitterbrush	5
Burnborough	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
1401*:					
Softscrabble	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Spike-fescue	5
				Snowberry	5
				Serviceberry	5
Gabica	Mountain Ridges, 12-16" p.z. (26-28)	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Sedge	5
				Rabbitbrush	5
				Antelope bitterbrush	5
Sumine	Stony Loam, 12-14" p.z. (23-15)	Favorable	1,050	Bluebunch wheatgrass	30
		Normal	750	Mountain big sagebrush	10
		Unfavorable	650	Antelope bitterbrush	10
				Thurber needlegrass	5
				Basin wildrye	5
				Idaho fescue	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1410*:					
Burnborough	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Ticino	Mahogany Slopes, 14-18" p.z. (26-9)	Favorable	1,000	Curlleaf mountainmahogany	45
		Normal	800	Mountain big sagebrush	5
		Unfavorable	600	Common snowberry	5
				Arrowleaf balsamroot	5
				Pine bluegrass	5
				Bottlebrush squirreltail	5
				Basin wildrye	5
Gabica	Mountain Ridges, 12-16" p.z. (26-28)	Favorable	350	Low sagebrush	25
		Normal	250	Thurber needlegrass	15
		Unfavorable	150	Sandberg bluegrass	10
				Sedge	5
				Rabbitbrush	5
				Antelope bitterbrush	5
1411*:					
Burnborough	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Snowberry	5
Ticino	Mahogany Slopes, 14-18" p.z. (26-9)	Favorable	1,000	Curlleaf mountainmahogany	45
		Normal	800	Mountain big sagebrush	5
		Unfavorable	600	Common snowberry	5
				Arrowleaf balsamroot	5
				Pine bluegrass	5
				Bottlebrush squirreltail	5
				Basin wildrye	5
Softscrabble	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	20
		Normal	950	Mountain brome	15
		Unfavorable	800	Mountain big sagebrush	15
				Basin wildrye	10
				Antelope bitterbrush	10
				Spike-fescue	5
				Snowberry	5
				Serviceberry	5
1420*:					
Barshaad	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Canby bluegrass	10
				Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Fugawee.					
Duckhill Variant.					
1430*:					
Fraval.					

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1430*:					
Booford	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	25
		Normal	1,050	Mountain brome	20
		Unfavorable	900	Basin wildrye	15
				Mountain big sagebrush	15
				Big sagebrush	10
Jumbo.					
1450*:					
Meiss	Very Shallow Loam (22-2)	Favorable	450	Bottlebrush squirreltail	20
		Normal	300	Wyethia	20
		Unfavorable	200	Lupine	15
				Mountain big sagebrush	15
				Trisetum	10
				Scarlet gilia	5
				Sedge	5
Sibelia.					
Rock outcrop.					
1480*:					
Macareeno.					
Blackwell	Wet Meadow (22-1)	Favorable	2,000	Nevada bluegrass	20
		Normal	1,500	Sedge	10
		Unfavorable	1,000	Willow	5
Carioca.					
1490*:					
Arzo	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
Indiano	Loamy, 10-12" p.z. (23)	Favorable	1,100	Bluebunch wheatgrass	40
		Normal	800	Wyoming big sagebrush	20
		Unfavorable	600	Thurber needlegrass	10
				Antelope bitterbrush	10
				Basin wildrye	5
Barnard	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Wyoming big sagebrush	20
		Normal	600	Thurber needlegrass	20
		Unfavorable	500	Antelope bitterbrush	10
				Indian ricegrass	10
				Western juniper	5
				Utah juniper	5
1510*:					
Cagle	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	20
		Normal	700	Wyoming big sagebrush	20
		Unfavorable	600	Antelope bitterbrush	10
				Basin wildrye	5
				Bottlebrush squirreltail	5
Nosrac	Loamy, 12-14" p.z. (26-5)	Favorable	1,100	Western needlegrass	25
		Normal	950	Mountain brome	20
		Unfavorable	800	Mountain big sagebrush	15
				Antelope bitterbrush	10
				Basin wildrye	10
				Spike-fescue	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1510*:					
Old Camp	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass	25
		Normal	450	Wyoming big sagebrush	15
		Unfavorable	300	Bottlebrush squirreltail	10
				Green ephedra	10
				Thurber needlegrass	5
				Douglas rabbitbrush	5
				Spiny hopsage	5
1521*:					
Duco.					
Yuko	South Slope, 8-12" p.z. (26-11)	Favorable	800	Desert needlegrass	30
		Normal	700	Thurber needlegrass	10
		Unfavorable	600	Green ephedra	10
				Wyoming big sagebrush	10
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
				Littleleaf horsebrush	5
				Douglas rabbitbrush	5
Lemm	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Bluebunch wheatgrass	5
1522*:					
Duco.					
Pahrange	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
Lemm	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Bluebunch wheatgrass	5
1530*:					
Bombadil	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass	25
		Normal	450	Wyoming big sagebrush	20
		Unfavorable	300	Green ephedra	10
				Thurber needlegrass	5
				Bottlebrush squirreltail	5
				Spiny hopsage	5
Hefed	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass	25
		Normal	450	Wyoming big sagebrush	15
		Unfavorable	300	Green ephedra	15
				Bottlebrush squirreltail	10
				Thurber needlegrass	5
				Douglas rabbitbrush	5
				Spiny hopsage	5
Rubble land.					

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1531*:					
Bombadil----------	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass------------	25
		Normal	450	Wyoming big sagebrush---------	20
		Unfavorable	300	Green ephedra-----------------	10
				Thurber needlegrass-----------	5
				Bottlebrush squirreltail------	5
				Spiny hopsage-----------------	5
Hefed-------------	Shallow Stony Loam, 8-10" p.z. (26-22)	Favorable	600	Desert needlegrass------------	25
		Normal	450	Wyoming big sagebrush---------	15
		Unfavorable	300	Green ephedra-----------------	15
				Bottlebrush squirreltail------	10
				Thurber needlegrass-----------	5
				Douglas rabbitbrush-----------	5
				Spiny hopsage-----------------	5
Fireball----------	Gravelly Loam, 6-8" p.z. (27-30)	Favorable	400	Bailey greasewood-------------	30
		Normal	200	Indian ricegrass--------------	15
		Unfavorable	50	Shadscale---------------------	15
				Bud sagebrush-----------------	10
				Bottlebrush squirreltail------	5
1540*:					
McQuarrie---------	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass-----------	20
		Normal	600	Big sagebrush-----------------	20
		Unfavorable	500	Indian ricegrass--------------	10
				Antelope bitterbrush----------	10
				Western juniper---------------	10
Tristan-----------	Loamy, 10-12" p.z. (26-10)----	Favorable	900	Thurber needlegrass-----------	20
		Normal	700	Wyoming big sagebrush---------	15
		Unfavorable	600	Basin wildrye-----------------	10
				Antelope bitterbrush----------	10
Arzo--------------	Loamy, 10-12" p.z. (26-10)----	Favorable	900	Thurber needlegrass-----------	25
		Normal	700	Wyoming big sagebrush---------	20
		Unfavorable	600	Basin wildrye-----------------	10
				Antelope bitterbrush----------	10
				Sandberg bluegrass------------	5
				Bottlebrush squirreltail------	5
1541*:					
McQuarrie---------	Juniper Savanna, 10-12" p.z. (26-17)	Favorable	700	Thurber needlegrass-----------	20
		Normal	600	Big sagebrush-----------------	20
		Unfavorable	500	Indian ricegrass--------------	10
				Antelope bitterbrush----------	10
				Western juniper---------------	10
Duco.					
Tristan-----------	Loamy, 10-12 p.z. (26-10)-----	Favorable	900	Thurber needlegrass-----------	20
		Normal	700	Wyoming big sagebrush---------	15
		Unfavorable	600	Basin wildrye-----------------	10
				Antelope bitterbrush----------	10
1550*:					
Skedaddle---------	Eroded South Slope, 8-10" p.z. (23)	Favorable	300	Purple sage-------------------	20
		Normal	200	Desert needlegrass------------	10
		Unfavorable	150	Antelope bitterbrush----------	10
				Green ephedra-----------------	10
				Bottlebrush squirreltail------	5
				Littleleaf horsebrush---------	5
				Wyoming big sagebrush---------	5
Pahrange----------	Claypan, 8-10" p.z. (26-25)---	Favorable	400	Thurber needlegrass-----------	25
		Normal	300	Low sagebrush-----------------	25
		Unfavorable	200	Bottlebrush squirreltail------	15
				Sandberg bluegrass------------	10

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1550*:					
Lemm	Loamy, 10-12" p.z. (26-10)	Favorable	900	Thurber needlegrass	25
		Normal	700	Wyoming big sagebrush	15
		Unfavorable	600	Basin wildrye	10
				Antelope bitterbrush	10
				Sandberg bluegrass	5
				Bottlebrush squirreltail	5
				Bluebunch wheatgrass	5
1570*:					
Bluewing	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Bailey greasewood	30
		Normal	200	Shadscale	20
		Unfavorable	50	Indian ricegrass	15
				Bud sagebrush	5
Biddleman	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Bailey greasewood	30
		Normal	200	Indian ricegrass	15
		Unfavorable	50	Shadscale	15
				Galleta	10
				Bottlebrush squirreltail	5
				Bud sagebrush	5
Bundorf	Gravelly Loam, 4-6" p.z. (27-18)	Favorable	400	Shadscale	30
		Normal	300	Indian ricegrass	20
		Unfavorable	200	Bud sagebrush	20
				Bottlebrush squirreltail	5
				Sandberg bluegrass	5
1580*:					
Frodo	Claypan, 10-12" p.z. (26-23)	Favorable	500	Thurber needlegrass	25
		Normal	400	Low sagebrush	15
		Unfavorable	300	Canby bluegrass	10
				Bottlebrush squirreltail	10
				Sandberg bluegrass	5
				Antelope bitterbrush	5
				Douglas rabbitbrush	5
				Littleleaf horsebrush	5
Xman	Claypan, 8-10" p.z. (26-25)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	20
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
Oppio	Claypan, 8-10" p.z. (26-23)	Favorable	400	Thurber needlegrass	25
		Normal	300	Low sagebrush	25
		Unfavorable	200	Bottlebrush squirreltail	15
				Sandberg bluegrass	10
				Littleleaf horsebrush	5
1590 Ruhe	Sandy, 4-8" p.z. (27-9)	Favorable	800	Indian ricegrass	40
		Normal	600	Needleandthread	15
		Unfavorable	400	Bailey greasewood	10
				Galleta	5
				Bud sagebrush	5
				Shadscale	5
				Winterfat	5
				Fourwing saltbush	5
1600*:					
Wrango	Droughty Loam, 8-10" p.z. (26-24)	Favorable	400	Wyoming big sagebrush	35
		Normal	300	Spiny hopsage	25
		Unfavorable	200	Indian ricegrass	10

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1600*:					
Ruhe	Sandy, 4-8" p.z. (27-9)	Favorable	800	Indian ricegrass	40
		Normal	600	Needleandthread	15
		Unfavorable	400	Bailey greasewood	10
				Galleta	5
				Bud sagebrush	5
				Shadscale	5
				Winterfat	5
				Fourwing saltbush	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
260*:								
Acrelane	3x	Moderate	Severe	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
Rock outcrop.								
262 Acrelane	3x	Moderate	Severe	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
390 Duckhill	6f	Severe	Moderate	Moderate	Moderate	Jeffrey pine	50	Jeffrey pine.
391*:								
Duckhill	6f	Severe	Moderate	Moderate	Moderate	Jeffrey pine	50	Jeffrey pine.
Hirschdale	4r	Moderate	Moderate	Severe	Severe	Jeffrey pine	72	Jeffrey pine.
Fraval	5f	Severe	Moderate	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
752*:								
Toiyabe	5x	Severe	Severe	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
Corbett	5o	Moderate	Slight	Moderate	Moderate	Jeffrey pine	70	Jeffrey pine.
Rock outcrop.								
753*:								
Toiyabe	5x	Severe	Severe	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
Corbett	5r	Severe	Moderate	Moderate	Moderate	Jeffrey pine	70	Jeffrey pine.
Rock outcrop.								
754*:								
Toiyabe	5x	Severe	Severe	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
Rock outcrop.								
756*:								
Toiyabe	5x	Severe	Severe	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
Corbett	5o	Moderate	Slight	Moderate	Moderate	Jeffrey pine	70	Jeffrey pine.
Haypress	4x	Severe	Severe	Moderate	Moderate	Jeffrey pine	75	Jeffrey pine.
820, 821 Marla	3w	Slight	Moderate	Moderate	Moderate	Lodgepole pine	90	White fir, Jeffrey pine.
840*:								
Temo	6x	Severe	Severe	Severe	Moderate	Jeffrey pine Western white pine California red fir	45 35 35	Jeffrey pine, western white pine, California red fir.
Witefels.	5s	Severe	Moderate	Moderate	Moderate	Jeffrey pine White fir California red fir	60 60 60	Jeffrey pine, white fir, California red fir.
Rock outcrop.								

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
880*:								
Zephan.								
Rock outcrop.								
Smallcone	7r	Severe	Moderate	Severe	Severe	Jeffrey pine	29	Jeffrey pine.
893*:								
Indiano.								
Duco	3x	Moderate	Moderate	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
Cagle	3x	Moderate	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	35 35	Singleleaf pinyon, Utah juniper.
894*:								
Indiano.								
Duco	3x	Moderate	Moderate	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
Skedaddle.								
895*:								
Indiano.								
Zephan.								
Duco	3x	Moderate	Moderate	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
1060, 1062*:								
Witefels	5s	Severe	Severe	Moderate	Moderate	Jeffrey pine White fir California red fir	60 60 60	Jeffrey pine, white fir, California red fir.
Rock outcrop.								
1080 Inville Variant	3w	Slight	Moderate	Slight	Moderate	Lodgepole pine	70	White fir.
1090 Railcity	4x	Moderate	Moderate	Moderate	Moderate	Jeffrey pine	80	Jeffrey pine.
1091 Railcity	4x	Slight	Moderate	Moderate	Moderate	Jeffrey pine	80	Jeffrey pine.
1100*:								
Graylock	5x	Severe	Severe	Moderate	---------	Lodgepole pine Whitebark pine	60 40	California red fir.
Temo	6x	Severe	Severe	Severe	Moderate	Jeffrey pine Western white pine California red fir	45 35 35	Jeffrey pine, western white pine, California red fir.
Rock outcrop.								
1120, 1121 Apmat	5f	Moderate	Slight	Moderate	Moderate	Jeffrey pine	68	Jeffrey pine.
1183*:								
Haypress	4x	Severe	Severe	Moderate	Moderate	Jeffrey pine	75	Jeffrey pine.
Rock outcrop.								

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
1371*:								
Singatse.								
Flex.								
Acrelane	3x	Moderate	Severe	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
1420*:								
Barshaad.								
Fugawee	4r	Severe	Moderate	Slight	Moderate	California red fir White fir	30 50	Jeffrey pine, California red fir, white fir, western white pine.
Duckhill Variant	7f	Severe	Moderate	Severe	Moderate	Jeffrey pine	40	Jeffrey pine.
1430*:								
Fraval	5f	Severe	Moderate	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
Booford.								
Jumbo	5f	Severe	Moderate	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
1431*:								
Fraval	5f	Severe	Moderate	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
Hirschdale	4r	Moderate	Moderate	Severe	Severe	Jeffrey pine	72	Jeffrey pine.
Duckhill Variant	7f	Severe	Moderate	Severe	Moderate	Jeffrey pine	40	Jeffrey pine.
1432*:								
Fraval	5f	Severe	Moderate	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
Hirschdale	4r	Moderate	Moderate	Severe	Severe	Jeffrey pine	72	Jeffrey pine.
Jumbo	5f	Severe	Moderate	Moderate	Moderate	Jeffrey pine	62	Jeffrey pine.
1440 Tallac	3f	Moderate	Moderate	Moderate	Slight	Jeffrey pine White fir California red fir	85 60 40	Jeffrey pine, white fir, California red fir, sugar pine, western white pine.
1441 Tallac	3f	Severe	Severe	Moderate	Slight	Jeffrey pine White fir California red fir	85 60 40	Jeffrey pine, white fir, California red fir, sugar pine, western white pine.
1450*:								
Meiss.								
Sibelia	2x	Moderate	Moderate	Moderate	Moderate	Western white pine Whitebark pine California red fir	62 48 30	California red fir.
Rock outcrop.								
1460*:								
Jorge	4f	Moderate	Moderate	Moderate	Moderate	California red fir White fir	30 50	California red fir, white fir, Jeffrey pine, western white pine.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
1460*:								
Boomtown	5x	Severe	Slight	Moderate	Moderate	White fir California red fir Jeffrey pine	55 40 75	White fir, California red fir, Jeffrey pine.
Fugawee	4x	Moderate	Slight	Slight	Moderate	California red fir White fir	30 50	Jeffrey pine, California red fir, white fir, western white pine.
1470*:								
Carioca	5w	Slight	Moderate	Moderate	Moderate	Lodgepole pine	62	White fir.
Sibelia Variant	5w	Moderate	Moderate	Moderate	Moderate	Lodgepole pine	62	Western white pine.
Fugawee	4x	Severe	Moderate	Slight	Moderate	California red fir White fir	30 50	Jeffrey pine, California red fir, white fir, western white pine.
1480*:								
Macareeno	---	--------	--------	--------	--------	Quaking aspen	---	
Blackwell.								
Carioca	5w	Moderate	Moderate	Moderate	Moderate	Lodgepole pine	62	White fir.
1510*:								
Cagle	3x	Moderate	Moderate	Moderate	Slight	Singleleaf pinyon Utah juniper	35 35	Singleleaf pinyon, Utah juniper.
Nosrac.								
Old Camp.								
1520*:								
Duco	2x	Moderate	Moderate	Moderate	Severe	Singleleaf pinyon Utah juniper	54 54	Singleleaf pinyon, Utah juniper.
Smallcone	7r	Severe	Moderate	Severe	Severe	Jeffrey pine	29	Jeffrey pine.
Cagle	3x	Slight	Slight	Moderate	Slight	Singleleaf pinyon Utah juniper	20 20	Singleleaf pinyon, Utah juniper.
1521*:								
Duco	3x	Moderate	Moderate	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
Yuko.								
Lemm.								
1522*:								
Duco	3x	Moderate	Moderate	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
Pahrange.								
Lemm.								
1541*:								
McQuarrie.								
Duco	3x	Moderate	Moderate	Moderate	Moderate	Utah juniper Western juniper	38 38	Utah juniper, western juniper.
Tristan.								

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
101, 102, 106----- Aquinas	Common juniper, golden currant.	Lilac, Tatarian honeysuckle.	Rocky Mountain juniper, Russian-olive.	Black locust, common chokecherry.	White poplar, Fremont cottonwood.
111*: Jowec Variant.					
Greenbrae---------	Forsythia, redosier dogwood.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	White poplar, American elm.
130--------------- Greenbrae	Common juniper, sierra currant.	American plum, lilac.	Utah juniper, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	Poplar, American elm.
131, 132---------- Greenbrae	Forsythia, redosier dogwood.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	White poplar, American elm.
134--------------- Greenbrae	Common juniper, sierra currant.	American plum, lilac.	Utah juniper, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	Poplar, American elm.
136--------------- Greenbrae	Forsythia, redosier dogwood.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	White poplar, American elm.
140, 141, 142----- Haybourne	Skunkbush sumac, common juniper.	Lilac, American plum.	Rocky Mountain juniper, Utah juniper.	Jeffrey pine, ponderosa pine.	Lombardy poplar, poplar.
160--------------- Incy	Forsythia, golden currant.	Tatarian honeysuckle, lilac.	Rocky Mountain juniper, Russian-olive.	Common hackberry, green ash.	Poplar, Fremont cottonwood.
190, 191, 192----- Manogue	Redosier dogwood, golden currant.	Lilac, Tatarian honeysuckle.	Russian-olive, Rocky Mountain juniper.	Siberian elm, green ash.	Fremont cottonwood, Lombardy poplar.
200, 201, 202----- Northmore	Redosier dogwood, forsythia.	Lilac, Siberian peashrub.	Rocky Mountain juniper, northern white-cedar.	Green ash, honeylocust.	American elm, Lombardy poplar.
230--------------- Cradlebaugh	Common juniper, golden currant.	Arroyo willow, coyote willow.	Russian-olive, silver buffaloberry.	Russian-olive, honeylocust, Siberian elm.	Lombardy poplar, Fremont cottonwood.
240, 241---------- Updike	Common juniper, big saltbush.	Lilac, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	White mulberry, Siberian elm.	Fremont cottonwood, white willow.
250, 251, 252----- Cassiro	Cotoneaster, common juniper.	Lilac, American plum.	Green ash, Utah juniper, Siberian crabapple.	Golden willow, Scotch pine.	Fremont cottonwood, Lombardy poplar.
370--------------- Lemm	Skunkbush sumac, sierra currant.	Siberian peashrub, American plum.	Rocky Mountain juniper, singleleaf pinyon.	Siberian elm, Jeffrey pine.	American elm, Lombardy poplar.

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
401, 403---------- Jubilee Variant	Big saltbush, common juniper.	Lilac, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	White mulberry, Siberian elm.	Fremont cottonwood, Lombardy poplar.
410, 411---------- Ophir	Cotoneaster, redosier dogwood.	Siberian peashrub, lilac.	Rocky Mountain juniper, Russian-olive.	Golden willow, narrowleaf cottonwood.	White poplar, white willow.
423--------------- Godecke Variant	Big saltbush, common juniper.	Lilac, coyote willow.	Russian-olive, Rocky Mountain juniper.	White mulberry, Siberian elm.	Eastern cottonwood, Lombardy poplar.
430--------------- Sagouspe Variant	Cotoneaster, redosier dogwood.	Amur honeysuckle, lilac.	Rocky Mountain juniper, Russian-olive.	Golden willow, narrowleaf cottonwood.	White poplar, Fremont cottonwood.
440, 441, 442, 443, 445--------- Jubilee	Cotoneaster, redosier dogwood.	Amur honeysuckle, lilac.	Rocky Mountain juniper, Russian-olive.	Green ash, golden willow.	Fremont cottonwood, Lombardy poplar.
450--------------- Voltaire	Big saltbush, fourwing saltbush.	Arroyo willow, coyote willow.	Russian-olive, silver buffaloberry.	Green ash, golden willow.	Robusta cottonwood, poplar.
451, 452---------- Voltaire	Fourwing saltbush, big saltbush.	Arroyo willow, coyote willow.	Russian-olive, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Fremont cottonwood, poplar.
454--------------- Voltaire	Cotoneaster, golden currant.	American plum, Utah serviceberry, Siberian peashrub.	Siberian crabapple, hawthorn.	Jeffrey pine, green ash.	Lombardy poplar, robusta cottonwood.
455*: Voltaire---------	Cotoneaster, golden currant.	American plum, Utah serviceberry, Siberian peashrub.	Siberian crabapple, hawthorn.	Jeffrey pine, green ash.	Lombardy poplar, robusta cottonwood.
Truckee----------	Forsythia, common juniper.	Autumn-olive, lilac.	Rocky Mountain juniper, Russian-olive.	Siberian elm, honeylocust.	American elm, Fremont cottonwood.
456--------------- Voltaire	Common juniper, golden currant.	Arroyo willow, coyote willow.	Russian-olive, silver buffaloberry.	Common chokecherry, golden willow.	Lombardy poplar, poplar.
460, 461---------- Surprise	Skunkbush sumac, golden currant.	American plum, Amur maple.	Rocky Mountain juniper, Utah juniper.	Common chokecherry, green ash.	American elm, poplar.
470--------------- Dalzell	Big saltbush, common juniper.	Arroyo willow, lilac.	Rocky Mountain juniper, Russian-olive.	Golden willow, Siberian elm.	Fremont cottonwood, white poplar.
480, 482---------- Holbrook	Skunkbush sumac, snowbrush ceanothus.	Rocky Mountain juniper, American plum.	Jeffrey pine, Siberian crabapple, Utah juniper.	Narrowleaf cottonwood.	Lombardy poplar.
494--------------- Graufels	Desert bitterbrush, golden currant.	Lilac, American plum.	Rocky Mountain juniper, Siberian crabapple.	Black locust, common chokecherry.	American elm, Lombardy poplar.

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
495*:					
Graufels	Desert bitterbrush, golden currant.	Lilac, American plum.	Rocky Mountain juniper, Siberian crabapple.	Black locust, common chokecherry.	American elm, Lombardy poplar.
Glenbrook.					
Rock outcrop.					
500, 504, 505----- Mottsville	Skunkbush sumac, common juniper.	Flowering crabapple, American plum.	Rocky Mountain juniper, Utah juniper.	Siberian elm, Jeffrey pine.	Lombardy poplar, Fremont cottonwood.
510---------------- Settlemeyer	Golden currant, cotoneaster.	Lilac, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	White mulberry, Siberian elm.	Fremont cottonwood, Lombardy poplar.
513*:					
Settlemeyer-------	Golden currant, cotoneaster.	Lilac, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	White mulberry, Siberian elm.	Fremont cottonwood, Lombardy poplar.
Notus-------------	Peking cotoneaster, redosier dogwood.	Siberian peashrub, honeysuckle.	Rocky Mountain juniper, Russian-olive.	Golden willow, narrowleaf cottonwood.	Poplar.
514---------------- Settlemeyer	Golden currant, cotoneaster.	Lilac, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	White mulberry, Siberian elm.	Fremont cottonwood, Lombardy poplar.
520---------------- Dressler	Peking cotoneaster, common juniper.	Siberian peashrub, arroyo willow.	Russian-olive, silver buffaloberry.	Golden willow, Siberian elm.	White poplar, Lombardy poplar.
530, 531----------- Sagouspe	Golden currant, common juniper.	Lilac, Siberian peashrub.	Rocky Mountain juniper, Utah juniper.	Common chokecherry, green ash.	Fremont cottonwood, poplar.
532---------------- Sagouspe	Redosier dogwood, fourwing saltbush.	Arroyo willow, coyote willow.	Russian-olive, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Fremont cottonwood, poplar.
550, 551, 553----- Leviathan	Forsythia, redosier dogwood.	American plum, lilac.	Rocky Mountain juniper, hawthorn.	Ponderosa pine, honeylocust.	Poplar, American elm.
570---------------- Turria	Common juniper, golden currant.	American plum, Amur honeysuckle.	Rocky Mountain juniper, Siberian crabapple.	Blue spruce, green ash.	American elm, poplar.
590, 591----------- Springmeyer	Forsythia, redosier dogwood.	Lilac, American plum.	Utah juniper, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	White poplar, American elm.
595---------------- Springmeyer	Forsythia, redosier dogwood.	Lilac, American plum.	Russian-olive, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	White poplar, American elm.
600, 601----------- Idlewild	Cotoneaster, redosier dogwood.	Lilac, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	Golden willow, white mulberry.	Fremont cottonwood, poplar.
602---------------- Idlewild	Peking cotoneaster, golden currant.	Siberian peashrub, lilac.	Rocky Mountain juniper, common chokecherry.	Golden willow, green ash.	Poplar, Fremont cottonwood.
620, 621, 622, 623, 624---------- Orr	Cotoneaster, redosier dogwood.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	White poplar, American elm.

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
630, 631, 632----- Fleischmann	Common juniper, cotoneaster.	Siberian peashrub, lilac.	Rocky Mountain juniper, hawthorn.	Siberian elm, honeylocust.	American elm, Fremont cottonwood.
640----- Notus	Peking cotoneaster, redosier dogwood.	Siberian peashrub, honeysuckle.	Rocky Mountain juniper, Russian-olive.	Golden willow-----	Poplar.
660, 661, 662, 663, 664----- Oest	Golden currant, skunkbush sumac.	American plum, lilac.	Russian-olive, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	White poplar, American elm.
669----- Oest	Golden currant, skunkbush sumac.	American plum, lilac.	Russian-olive, Rocky Mountain juniper.	Ponderosa pine, honeylocust.	White poplar, American elm.
670, 671----- Galeppi	Golden currant, redosier dogwood.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Green ash, black locust.	American elm, Lombardy poplar.
780----- Bieber	Common juniper, sierra currant.	Autumn-olive, Siberian peashrub.	Rocky Mountain juniper, Utah juniper.	Honeylocust, green ash.	Lombardy poplar, poplar.
782. Bieber					
800----- Truckee	Redosier dogwood, cotoneaster.	Lilac, Amur honeysuckle.	Russian-olive, Rocky Mountain juniper.	White mulberry, golden willow.	Fremont cottonwood, Lombardy poplar.
802----- Truckee	Cotoneaster, golden currant.	Lilac, Amur honeysuckle.	Russian-olive, Rocky Mountain juniper.	White mulberry, golden willow.	Fremont cottonwood, Lombardy poplar.
805----- Truckee	Cotoneaster, redosier dogwood.	Lilac, Amur honeysuckle.	Russian-olive, Rocky Mountain juniper.	Siberian elm, golden willow.	Fremont cottonwood, Lombardy poplar.
806----- Truckee	Cotoneaster, golden currant.	Lilac, Amur honeysuckle.	Russian-olive, Rocky Mountain juniper.	White mulberry, golden willow.	Fremont cottonwood, Lombardy poplar.
810, 812, 813----- Rose Creek	Cotoneaster, desert bitterbrush.	Lilac, Siberian peashrub.	Russian-olive, Utah juniper.	Green ash, golden willow.	Lombardy poplar, robusta cottonwood.
850----- Washoe	Forsythia, golden currant.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Ponderosa pine, honeylocust.	Poplar, American elm.
910, 911----- Vamp	Golden currant, sierra currant.	Coyote willow, arroyo willow.	Russian-olive, silver buffaloberry.	Narrowleaf cottonwood, Siberian elm.	Poplar, robusta cottonwood.
960, 961----- Kayo	Cotoneaster, golden currant.	American plum, flowering crabapple.	Rocky Mountain juniper, Russian-olive.	Green ash, Scotch pine.	Lombardy poplar, American elm.
971, 974----- Aladshi	Golden currant, redosier dogwood.	Lilac, autumn-olive.	Rocky Mountain juniper, Russian-olive.	Green ash, black locust.	American elm, Lombardy poplar.
1040, 1041----- Orr Variant	Common juniper, golden currant.	American plum, lilac.	Rocky Mountain juniper, Russian-olive.	Honeylocust, green ash.	Lombardy poplar, poplar.

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1054: Waspo	Common juniper, golden currant.	Lilac, Siberian peashrub.	Rocky Mountain juniper, Russian-olive.	Black locust, common chokecherry.	Lombardy poplar, white willow.
1080: Inville Variant	Cotoneaster, redosier dogwood.	Arroyo willow, lilac.	Russian-olive, Rocky Mountain juniper.	Golden willow, green ash.	White poplar, robusta cottonwood.
1130: Dithod	Golden currant, common juniper.	Lilac, Siberian peashrub.	Rocky Mountain juniper, Utah juniper.	Green ash, common chokecherry.	Poplar.
1141, 1142, 1143: Bedell	Skunkbush sumac, redosier dogwood.	Lilac, Tatarian honeysuckle.	Rocky Mountain juniper, Russian-olive.	Siberian elm, Jeffrey pine.	American elm, Lombardy poplar.
1170, 1171, 1172: Wedertz	Common juniper, sierra currant.	Lilac, American plum.	Rocky Mountain juniper, Utah	Green ash, golden willow.	Poplar, Lombardy poplar.
1190, 1191, 1192, 1193, 1194: Spasprey	Forsythia, redosier dogwood.	Lilac, Siberian peashrub.	Russian-olive, Rocky Mountain juniper.	Green ash, golden willow.	American elm, Lombardy poplar.
1200: Mellor	Fourwing saltbush, big saltbush.	Arroyo willow, Siberian peashrub.	Rocky Mountain juniper, Russian-olive.	Siberian elm, white mulberry.	White willow, Lombardy poplar.
1210: Linhart	Skunkbush sumac, golden currant.	Bladdersenna, lilac.	Rocky Mountain juniper, Russian-olive.	Siberian elm, Jeffrey pine.	White willow, American elm.
1220: Calpine	Skunkbush sumac, redosier dogwood.	Lilac, Siberian peashrub.	Rocky Mountain juniper, northern white-cedar.	Green ash, honeylocust.	American elm, Lombardy poplar.
1240: Pizene	Big saltbush, redosier dogwood.	Arroyo willow, coyote willow.	Russian mulberry, Russian-olive.	Black locust, golden willow.	Fremont cottonwood, Lombardy poplar.
1270*: Tristan.					
Indiano.					
Lemm	Skunkbush sumac, sierra currant.	Siberian peashrub, American plum.	Rocky Mountain juniper, singleleaf pinyon.	Siberian elm, Jeffrey pine.	American elm, Lombardy poplar.
1300, 1301: Rose Creek Variant	Common juniper, golden currant.	Lilac, oneseed juniper.	Rocky Mountain juniper, Utah juniper.	Common chokecherry, green ash.	Fremont cottonwood, poplar.
1310: Bango	Golden currant, common juniper.	Lilac, oneseed juniper.	Utah juniper, Russian-olive.	Common chokecherry, green ash.	Lombardy poplar, poplar.
1340*: Hawsley	Common juniper, sierra currant.	Arroyo willow, lilac.	American plum, Rocky Mountain juniper.	Utah juniper	Black locust, Siberian elm, Fremont cottonwood.
Ruhe.					
Bluewing.					

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
1341*:					
Isolde	Pyracantha, fourwing saltbush.	Coyote willow, Tatarian honeysuckle.	Utah juniper, Russian-olive.	Green ash, Scotch pine.	Fremont cottonwood, Lombardy poplar.
Dune land.					
1342*:					
Isolde	Pyracantha, fourwing saltbush.	Coyote willow, Tatarian honeysuckle.	Utah juniper, Russian-olive.	Green ash, Scotch pine.	Fremont cottonwood, Lombardy poplar.
Playas.					
1344*:					
Isolde	Pyracantha, fourwing saltbush.	Coyote willow, Tatarian honeysuckle.	Utah juniper, Russian-olive.	Green ash, Scotch pine.	Fremont cottonwood, Lombardy poplar.
Toulon.					
1345 Hawsley	Common juniper, sierra currant.	Arroyo willow, lilac.	American plum, Rocky Mountain juniper.	Utah juniper	Black locust, Siberian elm, Fremont cottonwood.
1350*:					
Stumble	Common juniper, golden currant.	American plum, oneseed juniper.	Russian-olive, Rocky Mountain juniper.	Green ash, narrowleaf cottonwood.	Golden willow, Athel, American elm, Siouxland cottonwood.
Ruhe.					
Bluewing.					
1351 Stumble	Common juniper, golden currant.	American plum, oneseed juniper.	Russian-olive, Rocky Mountain juniper.	Green ash, narrowleaf cottonwood.	Golden willow, Athel, American elm, Siouxland cottonwood.
1360*:					
Trocken.					
Stumble	Common juniper, golden currant.	American plum, oneseed juniper.	Russian-olive, Rocky Mountain juniper.	Green ash, narrowleaf cottonwood.	Golden willow, Athel, American elm, Siouxland cottonwood.
Bluewing.					
1372*:					
Isolde	Pyracantha, fourwing saltbush.	Coyote willow, fourwing saltbush, Tatarian honeysuckle.	Utah juniper, Russian-olive.	Green ash, Scotch pine.	Fremont cottonwood, Lombardy poplar.
1521*:					
Duco.					
Yuko.					
Lemm	Skunkbush sumac, sierra currant.	Siberian peashrub, American plum.	Rocky Mountain juniper, singleleaf pinyon.	Siberian elm, Jeffrey pine.	American elm, Lombardy poplar.

See footnote at end of table.

TABLE 7.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1522*:					
Duco.					
Pahrange.					
Lemm	Skunkbush sumac, sierra currant.	Siberian peashrub, American plum.	Rocky Mountain juniper, singleleaf pinyon.	Siberian elm, Jeffrey pine.	American elm, Lombardy poplar.
1550*:					
Skedaddle.					
Pahrange.					
Lemm	Skunkbush sumac, sierra currant.	Siberian peashrub, American plum.	Rocky Mountain juniper, singleleaf pinyon.	Siberian elm, Jeffrey pine.	American elm, Lombardy poplar.
1570*:					
Bluewing.					
Biddleman	Fourwing saltbush, common juniper.	Siberian peashrub, oneseed juniper.	Russian-olive	Utah juniper, narrowleaf cottonwood.	Siberian elm, poplar, Fremont cottonwood.
Bundorf.					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
101 Aquinas	Slight	Slight	Severe: slope.	Slight.
102, 106 Aquinas	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
110 Jowec Variant	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight.
111*:				
Jowec Variant	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight.
Greenbrae	Slight	Slight	Severe: slope.	Slight.
120 Doten	Severe: flooding, too clayey, excess salt.	Severe: too clayey, excess salt.	Severe: too clayey, excess salt.	Severe: too clayey.
121 Doten	Severe: too clayey, excess salt.	Severe: too clayey, excess salt.	Severe: slope, too clayey, excess salt.	Severe: too clayey.
130, 131 Greenbrae	Slight	Slight	Slight	Slight.
132 Greenbrae	Slight	Slight	Moderate: slope.	Slight.
134, 136 Greenbrae	Slight	Slight	Severe: slope.	Slight.
140 Haybourne	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight.
141 Haybourne	Severe: flooding.	Slight	Severe: slope.	Slight.
142 Haybourne	Severe: flooding.	Moderate: slope.	Severe: slope.	Slight.
150, 151 Doten Variant	Severe: percs slowly, too clayey, excess salt.	Severe: too clayey, excess salt, percs slowly.	Severe: too clayey, percs slowly, excess salt.	Severe: too clayey, erodes easily.
160 Incy	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
161 Incy	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.
171 Indian Creek	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Slight.
172, 173 Indian Creek	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan, slope.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
174 Indian Creek	Severe: large stones, cemented pan.	Severe: large stones, cemented pan.	Severe: large stones, small stones.	Severe: large stones.
175 Indian Creek	Severe: large stones, cemented pan.	Severe: large stones, cemented pan.	Severe: cemented pan, slope.	Severe: large stones.
176*:				
Indian Creek	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: large stones.
Reno	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.
Washoe	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Severe: large stones.
190 Manogue	Moderate: large stones, small stones.	Moderate: large stones, too clayey.	Severe: large stones, small stones.	Moderate: too clayey.
191 Manogue	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, too clayey.	Severe: large stones, slope, small stones.	Moderate: too clayey.
192 Manogue	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: too clayey, slope.
200 Northmore	Slight	Slight	Moderate: small stones.	Slight.
201 Northmore	Slight	Slight	Moderate: slope, small stones.	Slight.
202 Northmore	Slight	Slight	Severe: slope.	Slight.
203 Northmore	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
210, 211 Luppino	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
221 Oppio	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
222 Oppio	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
223*:				
Oppio	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
Rezave	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: large stones.
Rock outcrop.				
230 Cradlebaugh	Severe: flooding, wetness.	Moderate: wetness, excess salt, percs slowly.	Severe: wetness.	Moderate: wetness.
240 Updike	Moderate: percs slowly, dusty.	Moderate: percs slowly, dusty.	Moderate: small stones, percs slowly, dusty.	Severe: erodes easily.
241 Updike	Severe: flooding.	Moderate: percs slowly, dusty.	Moderate: small stones, percs slowly, dusty.	Severe: erodes easily.
250 Cassiro	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
251 Cassiro	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
252 Cassiro	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight.
260*:				
Acrelane	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
262 Acrelane	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones.
280 Wedekind	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: dusty.
281 Wedekind	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.
282 Wedekind	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
290 Verdico Variant	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight.
291 Verdico Variant	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.
300 Surgem	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
301*:				
Surgem	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.
Rock outcrop.				
302*:				
Surgem	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
310*:				
Risley	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: dusty.
Rock outcrop.				
311*:				
Risley	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope, dusty.
Rock outcrop.				
312 Risley	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.
313 Risley	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.
314*:				
Risley	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope, dusty.
Xman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
Rock outcrop.				
341 Yuko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope, dusty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
342*:				
Yuko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
Reywat	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope.
Rock outcrop.				
350 Mizel	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.
351*:				
Mizel	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.
Skedaddle	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
360*. Pits				
370 Lemm	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
390 Duckhill	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
391*:				
Duckhill	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Hirschdale	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Fraval	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: large stones, slope.
400 Jubilee Variant	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Moderate: wetness.
401, 403 Jubilee Variant	Severe: flooding.	Moderate: wetness, excess salt.	Moderate: wetness, excess salt.	Moderate: wetness.
410 Ophir	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
411 Ophir	Moderate: wetness.	Moderate: wetness.	Moderate: small stones, wetness.	Moderate: wetness.
420 Godecke	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Slight.
423 Godecke Variant	Moderate: percs slowly, excess salt.	Moderate: excess salt, percs slowly.	Moderate: percs slowly, excess salt.	Slight.
430, 431 Sagouspe Variant	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.
440 Jubilee	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.
441 Jubilee	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.
442 Jubilee	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Severe: small stones, too sandy, slope.	Moderate: wetness, too sandy.
443 Jubilee	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: wetness, too sandy, slope.	Moderate: wetness, too sandy.
445 Jubilee	Severe: flooding.	Slight	Moderate: small stones.	Slight.
450, 451 Voltaire	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
452 Voltaire	Severe: flooding, wetness, excess sodium.	Severe: wetness, excess sodium, excess salt.	Severe: wetness, excess sodium, excess salt.	Severe: wetness.
454 Voltaire	Severe: flooding, too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
455*:				
Voltaire	Severe: flooding, too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
Truckee	Severe: flooding.	Moderate: excess salt, dusty.	Moderate: dusty, excess salt.	Severe: erodes easily.
456 Voltaire	Severe: flooding.	Moderate: percs slowly.	Moderate: percs slowly.	Severe: erodes easily.
460 Surprise	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight.
461 Surprise	Severe: flooding.	Slight	Severe: slope.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
470 Dalzell	Severe: excess salt.	Severe: excess salt.	Severe: excess salt.	Slight.
480 Holbrook	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
482 Holbrook	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, small stones.	Moderate: large stones.
490 Graufels	Severe: too sandy.	Severe: too sandy.	Severe: slope.	Severe: too sandy.
491*:				
Graufels	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope.	Severe: too sandy.
Rock outcrop.				
492 Graufels	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope.	Severe: too sandy.
493*:				
Graufels	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Glenbrook	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: too sandy.
494 Graufels	Moderate: too sandy.	Moderate: too sandy.	Severe: slope, small stones.	Moderate: too sandy.
495*:				
Graufels	Moderate: too sandy.	Moderate: too sandy.	Severe: slope, small stones.	Moderate: too sandy.
Glenbrook	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: too sandy.
Rock outcrop.				
496*:				
Graufels	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Glenbrook	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: too sandy, slope.
Haypress	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
500 Mottsville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
504 Mottsville	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
505 Mottsville	Severe: too sandy.	Severe: too sandy.	Severe: slope, small stones, too sandy.	Severe: too sandy.
510 Settlemeyer	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
513*:				
Settlemeyer	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.
Notus	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
514 Settlemeyer	Severe: flooding, wetness.	Moderate: wetness, small stones, percs slowly.	Severe: small stones, wetness.	Moderate: wetness.
520 Dressler	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight.
530 Sagouspe	Severe: flooding, too sandy.	Severe: too sandy.	Slight	Severe: too sandy.
531 Sagouspe	Severe: flooding.	Slight	Slight	Slight.
532 Sagouspe	Severe: flooding, too sandy.	Severe: too sandy.	Severe: small stones, too sandy.	Severe: too sandy.
550, 551 Leviathan	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
553 Leviathan	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
554 Leviathan	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones.	Slight.
557 Leviathan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
559 Leviathan	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Moderate: large stones.
570 Turria	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.
585*:				
Barnard	Slight	Slight	Moderate: large stones, slope, small stones.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
585*:				
Trosi	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: large stones, slope, cemented pan.	Moderate: large stones.
590 Springmeyer	Slight	Slight	Moderate: small stones.	Slight.
591 Springmeyer	Slight	Slight	Moderate: slope, small stones.	Slight.
595 Springmeyer	Slight	Slight	Moderate: small stones.	Slight.
600, 601 Idlewild	Slight	Slight	Slight	Slight.
602 Idlewild	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
612 Verdico	Moderate: percs slowly.	Moderate: percs slowly.	Severe: large stones, slope.	Slight.
613 Verdico	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: large stones, slope.	Moderate: large stones.
614 Verdico	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.
615 Verdico	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight.
620 Orr	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
621 Orr	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
622 Orr	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
623 Orr	Slight	Slight	Moderate: small stones.	Slight.
624 Orr	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
630 Fleischmann	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
631 Fleischmann	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
632 Fleischmann	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: dusty.
640 Notus	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
650 Chalco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: large stones, slope.
651 Chalco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
652 Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones.	Moderate: large stones.
653 Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones.
654*:				
Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones.
Celeton Variant	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Slight.
660, 661 Oest	Moderate: small stones.	Moderate: small stones.	Severe: large stones, small stones.	Slight.
662 Oest	Moderate: small stones.	Moderate: small stones.	Severe: large stones, small stones.	Moderate: large stones.
663 Oest	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.
664 Oest	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.
668 Oest	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
669 Oest	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight.
670 Galeppi	Slight	Slight	Severe: slope.	Slight.
671 Galeppi	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
673 Galeppi	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
674 Galeppi	Moderate: large stones, slope.	Moderate: large stones, slope.	Severe: slope, large stones.	Moderate: large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
676*:				
Galeppi	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.
Barnard	Slight	Slight	Moderate: large stones, slope, small stones.	Slight.
681 Reno	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: large stones.
683 Reno	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones.
730 Stodick	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: slope, dusty.
731 Stodick	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.
740 Blackwell	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
752*:				
Toiyabe	Severe: slope, too sandy, depth to rock.	Severe: slope, too sandy, depth to rock.	Severe: large stones, slope, small stones.	Severe: too sandy.
Corbett	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: large stones, slope, small stones.	Severe: too sandy.
Rock outcrop.				
753*:				
Toiyabe	Severe: slope, too sandy, depth to rock.	Severe: slope, too sandy, depth to rock.	Severe: large stones, slope, small stones.	Severe: too sandy, slope.
Corbett	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: large stones, slope, small stones.	Severe: too sandy, slope.
Rock outcrop.				
754*:				
Toiyabe	Severe: slope, too sandy, depth to rock.	Severe: slope, too sandy, depth to rock.	Severe: large stones, slope, small stones.	Severe: too sandy, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
756*:				
Toiyabe	Severe: slope, too sandy, depth to rock.	Severe: slope, too sandy, depth to rock.	Severe: large stones, slope, small stones.	Severe: too sandy, slope.
Corbett	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: large stones, slope, small stones.	Severe: too sandy.
Haypress	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
772 Booford	Moderate: slope, large stones, percs slowly.	Moderate: slope, large stones, percs slowly.	Severe: large stones, slope.	Moderate: large stones.
775 Booford	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope, erodes easily.
780 Bieber	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Moderate: large stones.
782 Bieber	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Moderate: large stones.
800 Truckee	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.
802 Truckee	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.
805, 806 Truckee	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Slight.
810, 812 Rose Creek	Severe: flooding.	Slight	Moderate: small stones.	Slight.
813 Rose Creek	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
820 Marla	Severe: flooding, wetness.	Moderate: wetness.	Severe: slope, wetness.	Moderate: wetness.
821 Marla	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
830 Fettic	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: erodes easily.
831 Fettic	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Moderate: wetness.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
840*:				
Temo	Severe: slope, too sandy, depth to rock.	Severe: slope, too sandy, depth to rock.	Severe: large stones, slope, small stones.	Severe: too sandy, slope.
Witefels	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, small stones, too sandy.	Severe: too sandy, slope.
Rock outcrop.				
850 Washoe	Slight	Slight	Severe: small stones.	Slight.
861 Reywat	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones.
862 Reywat	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, depth to rock.	Severe: large stones.
863*:				
Reywat	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope.
Rock outcrop.				
870*:				
Xman	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
Rock outcrop.				
871 Xman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
872 Xman	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones.
873*:				
Xman	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Rock outcrop.				
875*:				
Xman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Zephan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
875*:				
Mizel	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.
876*:				
Xman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Oppio	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Old Camp	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: small stones, slope, large stones.	Severe: large stones, slope.
877*:				
Xman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Frodo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
Mizel	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.
880*:				
Zephan	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
Rock outcrop.				
Smallcone	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.
881 Zephan	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
882 Zephan	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
890 Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.
891 Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
892*:				
Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Koontz	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.
Flex	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
893*:				
Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.
894*:				
Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Skedaddle	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
895*:				
Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Zephan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
900 Flex	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
901 Flex	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
903 Flex	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Slight.
910 Vamp	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Slight.
911 Vamp	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.
930 Old Camp	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: small stones, slope, large stones.	Severe: large stones.
931*:				
Old Camp, extremely stony	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: small stones, slope, large stones.	Severe: large stones, slope.
Old Camp, stony	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: small stones, slope, large stones.	Severe: large stones.
Rock outcrop.				
932 Old Camp	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: small stones, slope, large stones.	Severe: large stones.
960 Kayo	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Slight.
961 Kayo	Severe: flooding, small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
962 Kayo	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Slight.
963 Kayo	Severe: flooding, slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Moderate: slope.
971 Aladshi	Severe: flooding.	Slight	Moderate: slope, small stones.	Slight.
974 Aladshi	Severe: flooding.	Moderate: small stones.	Severe: slope, small stones.	Slight.
980 Koontz	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: dusty.
982 Koontz	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
990*. Rock outcrop				
991*: Xeric Torriorthents.				
Urban land.				
992*. Playas				
993*. Haplaquolls				
994*: Badland.				
Chalco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: large stones, slope.
Verdico	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: large stones, slope.	Moderate: large stones.
996*: Dune land.				
Playas.				
997*. Badland				
998*. Beaches				
1010 Gabica	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: small stones.
1040 Orr Variant	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight.
1041 Orr Variant	Severe: flooding.	Slight	Moderate: small stones.	Slight.
1050 Waspo	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey.	Severe: too clayey.
1051 Waspo	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey.	Severe: too clayey, slope.
1052*: Waspo	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, percs slowly.	Severe: slope, too clayey.	Severe: too clayey, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1054-------------------- Waspo	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: small stones, too clayey.	Severe: too clayey.
1060*:				
Witefels--------------	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.
Rock outcrop.				
1062*:				
Witefels--------------	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy, slope.
Rock outcrop.				
1080-------------------- Inville Variant	Severe: flooding.	Moderate: small stones, percs sloely.	Severe: small stones.	Slight.
1090-------------------- Railcity	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: large stones, slope, small stones.	Severe: too sandy, slope.
1091-------------------- Railcity	Severe: too sandy.	Severe: too sandy.	Severe: large stones, slope, small stones.	Severe: too sandy.
1100*:				
Graylock--------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Temo------------------	Severe: slope, too sandy, depth to rock.	Severe: slope, too sandy, depth to rock.	Severe: large stones, slope, small stones.	Severe: too sandy, slope.
Rock outcrop.				
1120-------------------- Apmat	Severe: too sandy.	Severe: too sandy.	Moderate: slope, small stones.	Severe: too sandy.
1121-------------------- Apmat	Slight----------------	Slight----------------	Severe: small stones.	Slight.
1130-------------------- Dithod	Severe: flooding.	Slight----------------	Moderate: small stones.	Slight.
1141-------------------- Bedell	Severe: flooding.	Slight----------------	Moderate: slope, small stones.	Slight.
1142-------------------- Bedell	Severe: flooding.	Slight----------------	Severe: slope.	Slight.
1143-------------------- Bedell	Severe: flooding.	Moderate: slope.	Severe: slope.	Slight.
1160, 1161------------- Jowec	Severe: flooding.	Slight----------------	Slight----------------	Severe: erodes easily.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1170: Wedertz	Severe: flooding.	Slight	Moderate: slope.	Slight.
1171: Wedertz	Severe: flooding.	Slight	Severe: slope.	Slight.
1172: Wedertz	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
1181*:				
Haypress	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Tanob	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: too sandy, slope.
Rock outcrop.				
1182*:				
Haypress	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope, large stones.
Tanob	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: too sandy, slope.
Rock outcrop.				
1183*:				
Haypress	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
1190: Spasprey	Slight	Slight	Slight	Slight.
1191: Spasprey	Slight	Slight	Moderate: slope.	Slight.
1192: Spasprey	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
1193, 1194: Spasprey	Slight	Slight	Severe: slope.	Slight.
1200: Mellor	Severe: excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.
1210: Linhart	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones, slope.	Slight.
1211: Linhart	Severe: flooding, slope, small stones.	Severe: small stones, slope.	Severe: small stones, slope.	Moderate: slope.
1220: Calpine	Slight	Slight	Severe: slope.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1240: Pizene	Slight	Slight	Moderate: slope.	Slight.
1250: Rednik	Severe: flooding, small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
1251: Rednik	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
1260*:				
Thulepah	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
Mosquet	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: small stones, slope.	Moderate: large stones, slope.
1270*:				
Tristan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Lemm	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
1271*:				
Tristan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Barshaad	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, slope, percs slowly.	Moderate: large stones.
Arzo	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
1272*:				
Tristan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Arzo	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
Reywat	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1273*:				
Tristan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Barshaad	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, slope, percs slowly.	Moderate: large stones.
Frodo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
1290 Parran	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.
1300 Rose Creek Variant	Severe: flooding.	Moderate: percs slowly.	Moderate: small stones, percs slowly.	Slight.
1301 Rose Creek Variant	Severe: flooding.	Moderate: percs slowly.	Moderate: percs slowly.	Slight.
1310 Bango	Moderate: small stones, excess salt.	Moderate: small stones, excess salt.	Severe: small stones.	Slight.
1320*:				
Osobb	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones, slope.
Rezave	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: large stones.
Fireball	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.
1330*:				
Sutcliff	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
Kleinbush	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
Washoe	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Severe: large stones.
1331*:				
Sutcliff	Severe: small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1331*:				
Bundorf	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: large stones, slope, small stones.	Moderate: large stones.
Kleinbush	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
1340*:				
Hawsley	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
Ruhe	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight.
Bluewing	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
1341*:				
Isolde	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
Dune land.				
1342*:				
Isolde	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
Playas.				
1344*:				
Isolde	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
Toulon	Severe: small stones.	Severe: small stones.	Severe: small stones.	Moderate: dusty.
1345 Hawsley	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
1350*:				
Stumble	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Ruhe	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight.
Bluewing	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
1351 Stumble	Slight	Slight	Severe: slope.	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1360*:				
Trocken	Severe: flooding.	Moderate: slope, small stones.	Severe: large stones, slope, small stones.	Slight.
Stumble	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Bluewing	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
1361*:				
Trocken	Severe: flooding.	Moderate: slope, small stones.	Severe: large stones, slope, small stones.	Slight.
Ruhe	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, small stones, depth to rock.	Slight.
Bluewing	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
1362*:				
Trocken	Severe: flooding.	Moderate: slope, small stones.	Severe: large stones, slope, small stones.	Slight.
Badland.				
1363 Trocken	Severe: flooding.	Moderate: small stones.	Severe: large stones, slope, small stones.	Slight.
1364*:				
Trocken	Severe: flooding, slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
Wrango	Severe: flooding.	Moderate: small stones.	Severe: slope, small stones.	Slight.
1370*:				
Singatse	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
Fireball	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.
Rednik	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1371*:				
Singatse	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
Flex	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.
Acrelane	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
1372*:				
Singatse	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
Isolde	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
1373*:				
Singatse	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
Mizel	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.
Stingdorn	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
1374*:				
Singatse	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope.
Fireball	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.
Osobb	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.
1380*:				
Stingdorn	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: small stones.
Singatse	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, slope, depth to rock.	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1380*:				
Rock outcrop.				
1390*:				
Pirouette	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: large stones, small stones.	Moderate: large stones, dusty.
Osobb	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
Rock outcrop.				
1400*:				
Softscrabble	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Gabica	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, small stones, depth to rock.	Moderate: slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
1401*:				
Softscrabble	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
Gabica.				
Sumine	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
1410*:				
Burnborough	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
Ticino	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Gabica	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, small stones, depth to rock.	Moderate: slope.
1411*:				
Burnborough	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.
Ticino	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1411*:				
Softscrabble----------	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.
1420*:				
Barshaad--------------	Severe: percs slowly.	Severe: percs slowly.	Severe: large stones, slope, percs slowly.	Moderate: large stones.
Fugawee---------------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Duckhill Variant------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
1430*:				
Fraval----------------	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: large stones, slope.
Booford---------------	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: erodes easily.
Jumbo-----------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
1431*:				
Fraval----------------	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: large stones, slope.
Hirschdale------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Duckhill Variant------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
1432*:				
Fraval----------------	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: large stones, slope.
Hirschdale------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Jumbo-----------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1440-------------------- Tallac	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
1441-------------------- Tallac	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
1450*:				
Meiss------------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
Sibelia----------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Rock outcrop.				
1460*:				
Jorge------------------	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope.
Boomtown---------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Fugawee----------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
1470*:				
Carioca----------------	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight.
Sibelia Variant--------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Fugawee----------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
1480*:				
Macareeno--------------	Moderate: slope, wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Slight.
Blackwell--------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Carioca----------------	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.

* See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1490*:				
Arzo	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
Indiano	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.
Barnard	Slight	Slight	Moderate: large stones, slope, small stones.	Slight.
1510*:				
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.
Nosrac	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.
Old Camp	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: small stones, slope, large stones.	Severe: large stones, slope.
1520*:				
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Smallcone	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.
Cagle	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope.
1521*:				
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Yuko	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
Lemm	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
1522*:				
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1522*:				
Pahrange	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Lemm	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
1530*:				
Bombadil	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Hefed	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Rubble land.				
1531*:				
Bombadil	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Hefed	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Fireball	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: slope.
1540*:				
McQuarrie	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
Tristan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Arzo	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.
1541*:				
McQuarrie	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, depth to rock.	Severe: slope.
Duco	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1541*:				
Tristan	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
1550*:				
Skedaddle	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Pahrange	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.
Lemm	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.
1570*:				
Bluewing	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, small stones.	Severe: small stones.
Biddleman	Moderate: small stones.	Moderate: small stones.	Severe: slope, small stones.	Slight.
Bundorf	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: large stones, slope, small stones.	Moderate: large stones.
1580*:				
Frodo	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, small stones.	Moderate: large stones.
Xman	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.
Oppio	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.
1590 Ruhe	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight.
1600*:				
Wrango	Severe: flooding.	Moderate: small stones.	Severe: slope, small stones.	Slight.
Ruhe	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition and does not eliminate the need for onsite investigation]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
101: Aquinas	Moderate: cemented pan.	Moderate: shrink-swell.	Moderate: cemented pan, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.
102, 106: Aquinas	Moderate: cemented pan, slope.	Moderate: shrink-swell, slope.	Moderate: cemented pan, slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.
110: Jowec Variant	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.
111*:					
Jowec Variant	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, shrink-swell.
Greenbrae	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: low strength, frost action, shrink-swell.
120: Doten	Severe: too clayey.	Severe: shrink-swell, flooding, low strength.	Severe: shrink-swell, flooding, low strength.	Severe: shrink-swell, flooding, low strength.	Severe: shrink-swell, flooding, low strength.
121: Doten	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.	Severe: shrink-swell, low strength.
130: Greenbrae	Slight	Slight	Slight	Slight	Moderate: frost action.
131, 132: Greenbrae	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: low strength, frost action, shrink-swell.
134: Greenbrae	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.
136: Greenbrae	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: low strength, frost action, shrink-swell.
140, 141: Haybourne	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
142: Haybourne	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, frost action.
150, 151: Doten Variant	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
160-----Incy	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight.
161-----Incy	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
171, 172-----Indian Creek	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.
173-----Indian Creek	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.
174-----Indian Creek	Severe: cemented pan.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, low strength, shrink-swell.
175-----Indian Creek	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.
176*:					
Indian Creek-----	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.
Reno-----	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Washoe-----	Severe: cutbanks cave.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, shrink-swell, large stones.	Severe: slope.	Moderate: slope, frost action, shrink-swell.
190-----Manogue	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
191-----Manogue	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
192-----Manogue	Severe: cutbanks cave, slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
200, 201, 202-----Northmore	Slight-----	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
203-----Northmore	Moderate: slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
210-----Luppino	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Moderate: depth to rock, frost action.
211-----Luppino	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
221----------------- Oppio	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
222----------------- Oppio	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
223*:					
Oppio---------------	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Rezave--------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Rock outcrop.					
230----------------- Cradlebaugh	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.
240----------------- Updike	Moderate: too clayey, wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
241----------------- Updike	Severe: cutbanks cave.	Severe: shrink-swell, flooding.	Severe: shrink-swell, flooding.	Severe: shrink-swell, flooding.	Severe: low strength, shrink-swell.
250----------------- Cassiro	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.
251----------------- Cassiro	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.
252----------------- Cassiro	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, shrink-swell.
260*:					
Acrelane------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
262----------------- Acrelane	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.
280----------------- Wedekind	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.
281, 282------------ Wedekind	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
290----------------- Verdico Variant	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
291: Verdico Variant	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
300: Surgem	Severe: depth to rock, large stones.	Severe: large stones.	Severe: depth to rock, large stones.	Severe: slope, large stones.	Severe: large stones.
301*, 302*:					
Surgem	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Rock outcrop.					
310*:					
Risley	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Rock outcrop.					
311*:					
Risley	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Rock outcrop.					
312: Risley	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
313: Risley	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
314*:					
Risley	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Xman	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Rock outcrop.					
341: Yuko	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
342*:					
Yuko	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Reywat	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
342*:					
Rock outcrop.					
350---------------- Mizel	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
351*:					
Mizel------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Skedaddle--------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Rock outcrop.					
360*. Pits					
370---------------- Lemm	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: frost action.
390---------------- Duckhill	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
391*:					
Duckhill---------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Hirschdale-------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Fraval-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
400, 401, 403----- Jubilee Variant	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.
410---------------- Ophir	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: wetness, flooding.	Severe: flooding.	Moderate: wetness, frost action.
411---------------- Ophir	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: wetness, flooding.	Severe: flooding.	Moderate: wetness, frost action.
420---------------- Godecke	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
423---------------- Godecke Variant	Slight-----------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
430, 431---------- Sagouspe Variant	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, frost action.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
440, 441, 442, 443----------------- Jubilee	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: wetness, flooding.	Severe: flooding.	Severe: frost action.
445----------------- Jubilee	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
450, 451, 452------ Voltaire	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, frost action.
454----------------- Voltaire	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.
455*:					
Voltaire----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.
Truckee-----------	Slight-----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.
456----------------- Voltaire	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, frost action.
460, 461----------- Surprise	Slight-----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
470----------------- Dalzell	Severe: cutbanks cave.	Slight-----------	Moderate: wetness, cemented pan.	Slight-----------	Moderate: frost action.
480, 482----------- Holbrook	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
490----------------- Graufels	Severe: cutbanks cave.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.
491*:					
Graufels----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
492----------------- Graufels	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
493*:					
Graufels----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Glenbrook---------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
494----------------- Graufels	Severe: cutbanks cave.	Slight-----------	Moderate: depth to rock.	Moderate: slope.	Slight.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
495*:					
Graufels	Severe: cutbanks cave.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight.
Glenbrook	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.
Rock outcrop.					
496*:					
Graufels	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Glenbrook	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Haypress	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
500 Mottsville	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
504 Mottsville	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding.
505 Mottsville	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
510 Settlemeyer	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.
513*:					
Settlemeyer	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.
Notus	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
514 Settlemeyer	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.
520 Dressler	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.
530, 531 Sagouspe	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
532 Sagouspe	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
550 Leviathan	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
551 Leviathan	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
553: Leviathan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
554: Leviathan	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.
557: Leviathan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
559: Leviathan	Moderate: large stones.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.
570: Turria	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.
585*:					
Barnard	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Trosi	Severe: cemented pan, large stones.	Severe: cemented pan, large stones.	Severe: cemented pan, large stones.	Severe: cemented pan, large stones.	Severe: cemented pan.
590, 591: Springmeyer	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
595: Springmeyer	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
600, 601: Idlewild	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, frost action, shrink-swell.
602: Idlewild	Moderate: wetness, too clayey.	Severe: shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: shrink-swell, flooding.	Severe: low strength, frost action, shrink-swell.
612: Verdico	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
613: Verdico	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
614: Verdico	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
615: Verdico	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
620: Orr	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
621------- Orr	Slight-------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.
622------- Orr	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight-------	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
623, 624------- Orr	Slight-------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
630, 631------- Fleischmann	Moderate: cemented pan.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
632------- Fleischmann	Moderate: cemented pan, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
640------- Notus	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
650, 651------- Chalco	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
652------- Chalco	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
653------- Chalco	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
654*:					
Chalco-------	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
Celeton Variant--	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.
660, 661, 662----- Oest	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action, large stones.
663------- Oest	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
664------- Oest	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.
668------- Oest	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
669------- Oest	Severe: cutbanks cave.	Slight-------	Slight-------	Slight-------	Moderate: frost action.
670------- Galeppi	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
671----------------- Galeppi	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, shrink-swell.
673----------------- Galeppi	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
674----------------- Galeppi	Moderate: large stones, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, shrink-swell, large stones.	Severe: slope.	Moderate: low strength, slope, frost action.
676*:					
Galeppi-----------	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action, shrink-swell.
Barnard-----------	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
681----------------- Reno	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
683----------------- Reno	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
730, 731----------- Stodick	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
740----------------- Blackwell	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.
752*, 753*:					
Toiyabe-----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Corbett-----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
754*:					
Toiyabe-----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
756*:					
Toiyabe-----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Corbett-----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
756*:					
Haypress----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
772---------------- Booford	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
775---------------- Booford	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
780---------------- Bieber	Severe: cemented pan.	Severe: shrink-swell, cemented pan.	Severe: cemented pan.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, low strength, shrink-swell.
782---------------- Bieber	Severe: cemented pan.	Severe: shrink-swell, cemented pan.	Severe: cemented pan.	Severe: shrink-swell, slope, cemented pan.	Severe: cemented pan, low strength, shrink-swell.
800---------------- Truckee	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.
802---------------- Truckee	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.
805---------------- Truckee	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.
806---------------- Truckee	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.
810, 812, 813------ Rose Creek	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.
820, 821----------- Marla	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.
830, 831----------- Fettic	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, frost action.
840*:					
Temo---------------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Witefels----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
850---------------- Washoe	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.
861---------------- Reywat	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
862---------------- Reywat	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
863*:					
Reywat------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Rock outcrop.					
870*:					
Xman--------------	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Rock outcrop.					
871---------------- Xman	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
872---------------- Xman	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
873*:					
Xman--------------	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Rock outcrop.					
875*:					
Xman--------------	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Zephan------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Mizel-------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
876*:					
Xman--------------	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Oppio-------------	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Old Camp----------	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
877*:					
Xman	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Frodo	Severe: depth to rock, cemented pan, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, cemented pan, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.
Mizel	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
880*:					
Zephan	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Rock outcrop.					
Smallcone	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
881, 882 Zephan	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
890, 891 Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
892*:					
Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Koontz	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Flex	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
893*:					
Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Duco	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Cagle	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
894*:					
Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
894*:					
Duco	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Skedaddle	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
895*:					
Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Zephan	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Duco	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
900, 901 Flex	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
903 Flex	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.
910, 911 Vamp	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.
930 Old Camp	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
931*:					
Old Camp extremely stony	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Old Camp stony	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Rock outcrop.					
932 Old Camp	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.
960, 961, 962 Kayo	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
963 Kayo	Severe: cutbanks cave, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: slope.
971, 974 Aladshi	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
980------------- Koontz	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.
982------------- Koontz	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
990*. Rock outcrop					
991*: Xeric Torriorthents.					
Urban land.					
992*. Playas					
993*. Haplaquolls					
994*: Badland.					
Chalco-----------	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Verdico----------	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
996*: Dune land.					
Playas.					
997*. Badland					
998*. Beaches					
1010------------ Gabica	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
1040, 1041-------- Orr Variant	Slight-----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action, shrink-swell.
1050, 1051-------- Waspo	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
1052*: Waspo------------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1052*: Rock outcrop.					
1054: Waspo	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
1060*, 1062*: Witefels	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
1080: Inville Variant	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.
1090: Railcity	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1091: Railcity	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
1100*: Graylock	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Temo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
1120, 1121: Apmat	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: frost action, large stones.
1130: Dithod	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action, shrink-swell.
1141, 1142: Bedell	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
1143: Bedell	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, frost action.
1160, 1161: Jowec	Slight	Severe: flooding, shrink-swell.	Severe: flooding.	Severe: flooding, shrink-swell.	Severe: low strength, shrink-swell.
1170, 1171, 1172: Wedertz	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action, shrink-swell.
1181*: Haypress	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1181*:					
Tanob	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
1182*:					
Haypress	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Tanob	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
1183*:					
Haypress	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
1190, 1191, 1192 Spasprey	Severe: cutbanks cave.	Slight	Moderate: cemented pan.	Slight	Moderate: frost action.
1193, 1194 Spasprey	Severe: cutbanks cave.	Slight	Moderate: cemented pan.	Moderate: slope.	Moderate: frost action.
1200 Mellor	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.
1210 Linhart	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
1211 Linhart	Severe: cutbanks cave, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: slope.
1220 Calpine	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.
1240 Pizene	Slight	Slight	Slight	Slight	Slight.
1250 Rednik	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.
1251 Rednik	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, large stones.
1260*:					
Thulepah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mosquet	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.
1270*:					
Tristan	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1270*:					
Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Lemm	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1271*:					
Tristan	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Barshaad	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Arzo	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
1272*:					
Tristan	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Arzo	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Reywat	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
1273*:					
Tristan	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Barshaad	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Frodo	Severe: depth to rock, cemented pan, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, cemented pan, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.
1290 Parran	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, shrink-swell.	Severe: low strength, frost action, shrink-swell.
1300, 1301 Rose Creek Variant	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.
1310 Bango	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1320*:					
Osobb------------	Severe: depth to rock, cemented pan, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Rezave-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Fireball---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1330*:					
Sutcliff---------	Moderate: large stones, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Severe: low strength.
Kleinbush--------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
Washoe-----------	Severe: cutbanks cave.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, shrink-swell, large stones.	Severe: slope.	Moderate: slope, frost action, shrink-swell.
1331*:					
Sutcliff---------	Moderate: large stones, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Severe: low strength.
Bundorf----------	Severe: cemented pan.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell, slope, cemented pan.	Severe: cemented pan, shrink-swell.
Kleinbush--------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.
1340*:					
Hawsley----------	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
Ruhe-------------	Severe: depth to rock, cutbanks cave.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
Bluewing---------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: flooding.
1341*:					
Isolde-----------	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
Dune land.					
1342*:					
Isolde-----------	Severe: cutbanks cave.	Slight-----------	Slight-----------	Moderate: slope.	Slight.
Playas.					

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1344*:					
Isolde	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
Toulon	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: large stones.
1345 Hawsley	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
1350*:					
Stumble	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Ruhe	Severe: depth to rock, cutbanks cave.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.
Bluewing	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
1351 Stumble	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
1360*:					
Trocken	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding.
Stumble	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
Bluewing	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: flooding.
1361*:					
Trocken	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding.
Ruhe	Severe: depth to rock, cutbanks cave.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.
Bluewing	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: flooding.
1362*:					
Trocken	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding.
Badland.					
1363 Trocken	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
1364*:					
Trocken	Severe: cutbanks cave, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: flooding, slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1364*:					
Wrango	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.
1370*:					
Singatse	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Fireball	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rednik	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Moderate: slope, flooding, large stones.
1371*:					
Singatse	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Flex	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Acrelane	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
1372*:					
Singatse	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Isolde	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
1373*:					
Singatse	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Mizel	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Stingdorn	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock.	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
1374*:					
Singatse	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Fireball	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Osobb	Severe: depth to rock, cemented pan, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1380*:					
Stingdorn--------	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock.	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Singatse---------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Rock outcrop.					
1390*:					
Pirouette--------	Severe: depth to rock, cemented pan.	Severe: depth to rock.	Severe: depth to rock, cemented pan.	Severe: depth to rock.	Severe: depth to rock.
Osobb------------	Severe: depth to rock, cemented pan, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
Rock outcrop.					
1400*:					
Softscrabble-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gabica-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Burnborough------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1401*:					
Softscrabble-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gabica-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Sumine-----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
1410*:					
Burnborough------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ticino-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Gabica-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
1411*:					
Burnborough------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ticino-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Softscrabble-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1420*:					
Barshaad	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
Fugawee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Duckhill Variant	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
1430*:					
Fraval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Booford	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Jumbo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1431*:					
Fraval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hirschdale	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Duckhill Variant	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
1432*:					
Fraval	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hirschdale	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Jumbo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1440 Tallac	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
1441 Tallac	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1450*:					
Meiss	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Sibelia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1460*:					
Jorge	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Boomtown	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Fugawee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1470*:					
Carioca	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Moderate: slope, frost action.
Sibelia Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Fugawee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1480*:					
Macareeno	Severe: wetness.	Moderate: slope, wetness, shrink-swell.	Severe: wetness.	Severe: slope.	Severe: frost action.
Blackwell	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.
Carioca	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1490*:					
Arzo	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Indiano	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Barrard	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.
1510*:					
Cagle	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
Nosrac	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Old Camp	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.
1520*:					
Duco	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1520*:					
Smallcone	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Cagle	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.
1521*:					
Duco	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Yuko	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.
Lemm	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1522*:					
Duco	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Pahrange	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lemm	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1530*:					
Bombadil	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Hefed	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rubble land.					
1531*:					
Bombadil	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Hefed	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Fireball	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1540*:					
McQuarrie	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Tristan	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1540*:					
Arzo	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
1541*:					
McQuarrie	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Duco	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Tristan	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
1550*:					
Skedaddle	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Pahrange	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lemm	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1570*:					
Bluewing	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Biddleman	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight.
Bundorf	Severe: cemented pan.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell, cemented pan.	Severe: cemented pan, shrink-swell.
1580*:					
Frodo	Severe: depth to rock, cemented pan.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, cemented pan.	Severe: shrink-swell, depth to rock.	Severe: depth to rock, low strength.
Xman	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.
Oppio	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.
1590 Ruhe	Severe: depth to rock, cutbanks cave.	Severe: flooding.	Severe: flooding, depth to rock.	Severe: flooding.	Moderate: depth to rock, flooding.
1600*:					
Wrango	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.
Ruhe	Severe: depth to rock, cutbanks cave.	Severe: flooding.	Severe: flooding, depth to rock.	Severe: flooding.	Moderate: depth to rock, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition and does not eliminate the need for onsite investigation]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
101 Aquinas	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
102, 106 Aquinas	Severe: cemented pan, percs slowly.	Severe: cemented pan, slope.	Moderate: cemented pan, slope.	Severe: cemented pan.	Poor: area reclaim.
110 Jowec Variant	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
111*:					
Jowec Variant	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Greenbrae	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too sandy.	Slight	Poor: too sandy.
120 Doten	Severe: percs slowly.	Slight	Severe: too clayey, flooding, wetness.	Severe: flooding.	Poor: too clayey.
121 Doten	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
130 Greenbrae	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Good.
131 Greenbrae	Severe: percs slowly.	Moderate: seepage.	Severe: too sandy.	Slight	Poor: too sandy.
132 Greenbrae	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too sandy.	Slight	Poor: too sandy.
134 Greenbrae	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Good.
136 Greenbrae	Severe: percs slowly.	Moderate: seepage, slope.	Severe: too sandy.	Slight	Poor: too sandy.
140, 141 Haybourne	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: too sandy.
142 Haybourne	Severe: poor filter.	Severe: seepage, flooding, slope.	Severe: too sandy.	Moderate: flooding, slope.	Poor: too sandy.
150, 151 Doten Variant	Severe: percs slowly.	Slight	Severe: wetness, too clayey, excess salt.	Slight	Poor: too clayey, hard to pack.
160 Incy	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight	Poor: seepage, too sandy.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
161----------------- Incy	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: slope, too sandy.	Severe: slope.	Poor: seepage, too sandy, slope.
171, 172----------- Indian Creek	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
173----------------- Indian Creék	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
174----------------- Indian Creek	Severe: cemented pan.	Severe: cemented pan, large stones.	Severe: cemented pan, large stones.	Severe: cemented pan.	Poor: area reclaim, hard to pack, small stones.
175----------------- Indian Creek	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
176*:					
Indian Creek--------	Severe: cemented pan, percs slowly.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.
Reno---------------	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
Washoe-------------	Severe: percs slowly, poor filter.	Severe: seepage, slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: small stones.
190----------------- Manogue	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
191----------------- Manogue	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
192----------------- Manogue	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
200, 201, 202------- Northmore	Severe: percs slowly.	Severe: seepage.	Moderate: too clayey.	Severe: seepage.	Fair: too clayey.
203----------------- Northmore	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope, too clayey.	Severe: seepage.	Fair: too clayey, slope.
210----------------- Luppino	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
211----------------- Luppino	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
221----------------- Oppio	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
222----------------- Oppio	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
223*:					
Oppio---------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Rezave--------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, small stones.
Rock outcrop.					
230----------------- Cradlebaugh	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, excess salt.
240----------------- Updike	Severe: percs slowly.	Slight-----------	Severe: wetness.	Slight-----------	Poor: hard to pack.
241----------------- Updike	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: wetness.	Moderate: wetness, flooding.	Poor: hard to pack.
250, 251------------ Cassiro	Severe: percs slowly.	Severe: seepage.	Severe: depth to rock, too clayey.	Severe: seepage.	Poor: too clayey, small stones.
252----------------- Cassiro	Severe: percs slowly.	Severe: seepage, slope.	Severe: depth to rock, too clayey.	Severe: seepage.	Poor: too clayey, small stones.
260*:					
Acrelane------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Rock outcrop.					
262----------------- Acrelane	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
280----------------- Wedekind	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
281, 282------------ Wedekind	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
290----------------- Verdico Variant	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
291------------------ Verdico Variant	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
300------------------ Surgem	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim, hard to pack, large stones.
301*, 302*:					
Surgem--------------	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
Rock outcrop.					
310*:					
Risley--------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
Rock outcrop.					
311*:					
Risley--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Rock outcrop.					
312------------------ Risley	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
313------------------ Risley	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
314*:					
Risley--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Xman----------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Rock outcrop.					
341------------------ Yuko	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
342*:					
Yuko----------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Reywat--------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
350 Mizel	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
351*: Mizel	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Skedaddle	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Rock outcrop.					
360*. Pits					
370 Lemm	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Poor: small stones.
390 Duckhill	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
391*: Duckhill	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Hirschdale	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Fraval	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
400 Jubilee Variant	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, excess salt.	Severe: seepage, wetness.	Poor: excess salt.
401, 403 Jubilee Variant	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too sandy, wetness.
410, 411 Ophir	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy.
420 Godecke	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, excess sodium, excess salt.	Severe: wetness.	Severe: excess salt, excess sodium.
423 Godecke Variant	Severe: percs slowly.	Moderate: cemented pan.	Moderate: cemented pan.	Severe: seepage.	Fair: area reclaim, thin layer.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
430, 431------------ Sagouspe Variant	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
440, 441, 442, 443-- Jubilee	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Fair: wetness.
445----------------- Jubilee	Moderate: flooding, wetness.	Severe: seepage, flooding.	Severe: seepage, wetness.	Severe: seepage.	Fair: too sandy.
450, 451------------ Voltaire	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
452----------------- Voltaire	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, excess sodium, excess salt.	Severe: wetness.	Poor: wetness, excess salt, excess sodium.
454----------------- Voltaire	Severe: percs slowly.	Severe: flooding.	Severe: wetness.	Moderate: flooding.	Fair: too clayey.
455*:					
Voltaire------------	Severe: percs slowly.	Severe: flooding.	Severe: wetness.	Moderate: flooding.	Fair: too clayey.
Truckee-------------	Severe: percs slowly.	Severe: flooding.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
456----------------- Voltaire	Severe: wetness, percs slowly.	Severe: seepage, flooding.	Severe: seepage, wetness, too clayey.	Severe: seepage.	Poor: too clayey.
460, 461------------ Surprise	Moderate: flooding.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Poor: small stones.
470----------------- Dalzell	Severe: cemented pan, wetness.	Severe: seepage, cemented pan.	Severe: wetness, too sandy.	Severe: cemented pan.	Poor: area reclaim, seepage, too sandy.
480, 482------------ Holbrook	Moderate: flooding.	Severe: seepage, flooding.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, small stones.
490----------------- Graufels	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, too sandy.
491*:					
Graufels------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, too sandy, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
492------------------ Graufels	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, too sandy, slope.
493*:					
Graufels------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, too sandy, slope.
Glenbrook-----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, too sandy.	Severe: depth to rock, slope.	Poor: area reclaim, seepage, too sandy.
494------------------ Graufels	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, too sandy.
495*:					
Graufels------------	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, too sandy.
Glenbrook-----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, too sandy.	Severe: depth to rock.	Poor: area reclaim, seepage, too sandy.
Rock outcrop.					
496*:					
Graufels------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, too sandy, slope.
Glenbrook-----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope, too sandy.	Severe: depth to rock, slope.	Poor: area reclaim, seepage, too sandy.
Haypress------------	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope.
500------------------ Mottsville	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
504------------------ Mottsville	Severe: poor filter.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
505------------------ Mottsville	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
510------------------ Settlemeyer	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
513*:					
Settlemeyer	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Notus	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy, small stones.
514 Settlemeyer	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
520 Dressler	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, large stones.
530, 531 Sagouspe	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy.
532 Sagouspe	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: too sandy.
550 Leviathan	Severe: percs slowly.	Slight	Slight	Slight	Poor: small stones.
551 Leviathan	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Poor: small stones.
553 Leviathan	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
554 Leviathan	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Poor: small stones.
557 Leviathan	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
559 Leviathan	Severe: percs slowly.	Moderate: slope, large stones.	Moderate: large stones.	Slight	Poor: small stones.
570 Turria	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
585*:					
Barnard	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan, too clayey.	Severe: cemented pan.	Poor: area reclaim, too clayey, hard to pack.
Trosi	Severe: cemented pan.	Severe: cemented pan, large stones.	Severe: cemented pan.	Severe: cemented pan.	Poor: thin layer, large stones, slope.
590 Springmeyer	Severe: percs slowly.	Moderate: seepage.	Slight	Slight	Poor: small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
591----------------- Springmeyer	Severe: percs slowly.	Moderate: seepage, slope.	Slight-----------	Slight-----------	Poor: small stones.
595----------------- Springmeyer	Severe: percs slowly.	Moderate: seepage.	Moderate: too sandy.	Slight-----------	Fair: too sandy, small stones.
600----------------- Idlewild	Severe: percs slowly.	Slight-----------	Severe: too clayey.	Slight-----------	Poor: too clayey.
601----------------- Idlewild	Severe: percs slowly.	Moderate: seepage.	Severe: too clayey.	Slight-----------	Poor: too clayey.
602----------------- Idlewild	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
612----------------- Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
613----------------- Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
614----------------- Verdico	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
615----------------- Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
620, 621------------ Orr	Severe: percs slowly.	Moderate: seepage, slope.	Slight-----------	Slight-----------	Fair: small stones.
622----------------- Orr	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
623, 624------------ Orr	Severe: percs slowly.	Moderate: seepage.	Slight-----------	Slight-----------	Fair: small stones.
630, 631------------ Fleischmann	Severe: cemented pan.	Severe: cemented pan.	Severe: too clayey.	Severe: cemented pan.	Poor: area reclaim, too clayey, hard to pack.
632----------------- Fleischmann	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: too clayey.	Severe: cemented pan.	Poor: area reclaim, too clayey, hard to pack.
640----------------- Notus	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy, small stones.
650, 651------------ Chalco	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
652: Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
653: Chalco	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
654*:					
Chalco	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Celeton Variant	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
660, 661: Oest	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
662: Oest	Severe: poor filter.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones.
663: Oest	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: small stones, slope.
664: Oest	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Poor: small stones.
668: Oest	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
669: Oest	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
670: Galeppi	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
671: Galeppi	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
673: Galeppi	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
674: Galeppi	Severe: percs slowly.	Severe: slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
676*:					
Galeppi	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Barnard	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan, too clayey.	Severe: cemented pan.	Poor: area reclaim, too clayey, hard to pack.
681: Reno	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
683 Reno	Severe: cemented pan.	Severe: cemented pan.	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Poor: area reclaim, hard to pack.
730, 731 Stodick	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
740 Blackwell	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness.	Poor: too sandy, wetness.
752*, 753*:					
Toiyabe	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Corbett	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, slope.
Rock outcrop.					
754*:					
Toiyabe	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Rock outcrop.					
756*:					
Toiyabe	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Corbett	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, slope.
Haypress	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope.
772 Booford	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
775 Booford	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
780 Bieber	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
782 Bieber	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
800------------------ Truckee	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
802------------------ Truckee	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, excess salt.	Severe: wetness.	Poor: excess salt.
805------------------ Truckee	Severe: percs slowly, poor filter.	Severe: seepage, flooding, small stones.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
806------------------ Truckee	Severe: wetness, percs slowly, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Fair: too sandy, wetness.
810, 812, 813-------- Rose Creek	Moderate: flooding, wetness.	Severe: seepage, flooding.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: too sandy.
820, 821------------- Marla	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, wetness.
830, 831------------- Fettic	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey, excess sodium.	Severe: wetness.	Poor: too clayey, excess salt, excess sodium.
840*:					
Temo-----------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Witefels-------------	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, too sandy, slope.
Rock outcrop.					
850------------------ Washoe	Severe: percs slowly, poor filter.	Severe: seepage.	Moderate: large stones.	Slight------------	Poor: small stones.
861------------------ Reywat	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
862------------------ Reywat	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
863*:					
Reywat---------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
870*:					
Xman	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
Rock outcrop.					
871 Xman	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
872 Xman	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
873*:					
Xman	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Rock outcrop.					
875*:					
Xman	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Zephan	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
Mizel	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
876*:					
Xman	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Oppio	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Old Camp	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
877*:					
Xman	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Frodo	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
877*:					
Mizel	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
880*:					
Zephan	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
Rock outcrop.					
Smallcone	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
881, 882 Zephan	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
890, 891 Indiano	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
892*:					
Indiano	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Koontz	Severe: depth to rock, slope.	Severe: slope, small stones, depth to rock.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Flex	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
893*:					
Indiano	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
894*:					
Indiano	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
894*: Skedaddle	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
895*: Indiano	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Zephan	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, large stones.
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
900, 901 Flex	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
903 Flex	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
910, 911 Vamp	Severe: cemented pan, wetness.	Severe: seepage, cemented pan, flooding.	Severe: wetness, excess salt.	Severe: cemented pan, wetness.	Poor: area reclaim.
930 Old Camp	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
931*: Old Camp extremely stony	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Old Camp stony	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
Rock outcrop.					
932 Old Camp	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim, large stones.
960, 961, 962 Kayo	Severe: poor filter.	Severe: seepage, flooding.	Moderate: flooding, too sandy.	Moderate: flooding.	Poor: seepage, small stones.
963 Kayo	Severe: poor filter, slope.	Severe: seepage, flooding, slope.	Severe: slope.	Severe: slope.	Poor: seepage, small stones, slope.
971, 974 Aladshi	Severe: percs slowly.	Severe: seepage, flooding.	Moderate: flooding, too sandy.	Moderate: flooding.	Poor: small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
980: Koontz	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
982: Koontz	Severe: depth to rock, slope.	Severe: slope, small stones.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
990*. Rock outcrop					
991*: Xeric Torriorthents.					
Urban land.					
992*. Playas					
993*. Haplaquolls					
994*: Badland.					
Chalco	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Verdico	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
996*: Dune land.					
Playas.					
997*. Badland					
998*. Beaches					
1010: Gabica	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
1040, 1041: Orr Variant	Severe: percs slowly.	Severe: flooding.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
1050, 1051: Waspo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
1052*: Waspo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Rock outcrop.					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1054------------------ Waspo	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
1060*, 1062*:					
Witefels------------	Severe: depth to rock, poor filter, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, too sandy, slope.
Rock outcrop.					
1080------------------ Inville Variant	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: small stones.
1090------------------ Railcity	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1091------------------ Railcity	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1100*:					
Graylock------------	Severe: slope.	Severe: slope, seepage, small stones.	Severe: seepage, slope.	Severe: slope, seepage.	Poor: slope, too sandy, small stones.
Temo------------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.
Rock outcrop.					
1120, 1121----------- Apmat	Severe: poor filter.	Severe: seepage.	Severe: seepage, large stones.	Severe: seepage.	Poor: large stones.
1130------------------ Dithod	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
1141, 1142----------- Bedell	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage.	Severe: seepage.	Fair: thin layer.
1143------------------ Bedell	Severe: poor filter.	Severe: seepage, flooding, slope.	Severe: seepage.	Severe: seepage.	Fair: slope, thin layer.
1160, 1161----------- Jowec	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
1170, 1171, 1172----- Wedertz	Severe: percs slowly, poor filter.	Severe: seepage, flooding.	Moderate: flooding, too sandy.	Moderate: flooding.	Fair: too sandy, small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1181*:					
Haypress	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope.
Tanob	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
Rock outcrop.					
1182*:					
Haypress	Severe: poor filter, slope, large stones.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope, large stones.
Tanob	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
Rock outcrop.					
1183*:					
Haypress	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope.
Rock outcrop.					
1190, 1191, 1192, 1193, 1194 Spasprey	Severe: cemented pan.	Severe: seepage, cemented pan.	Moderate: cemented pan, too sandy.	Severe: cemented pan.	Poor: area reclaim.
1200 Mellor	Severe: percs slowly.	Slight	Severe: excess salt.	Slight	Good.
1210 Linhart	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: seepage, too sandy, small stones.
1211 Linhart	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: flooding, slope.	Poor: seepage, too sandy, small stones.
1220 Calpine	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
1240 Pizene	Slight	Severe: seepage.	Slight	Slight	Good.
1250 Rednik	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1251 Rednik	Severe: poor filter.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1260*:					
Thulepah	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Mosquet	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
1270*:					
Tristan	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.
Indiano	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Lemm	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
1271*:					
Tristan	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.
Barshaad	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Arzo	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
1272*:					
Tristan	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.
Arzo	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Reywat	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
1273*:					
Tristan	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.
Barshaad	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1273*:					
Frodo	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, too clayey, hard to pack.
1290 Parran	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, excess salt.	Severe: wetness.	Poor: too clayey, hard to pack, excess salt.
1300, 1301 Rose Creek Variant	Severe: percs slowly.	Severe: flooding.	Severe: wetness.	Moderate: flooding.	Fair: too sandy, small stones.
1310 Bango	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
1320*:					
Osobb	Severe: depth to rock, cemented pan, slope.	Severe: seepage, depth to rock, cemented pan.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, seepage, small stones.
Rezave	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, small stones.
Fireball	Severe: slope.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
1330*:					
Sutcliff	Severe: percs slowly.	Severe: slope, large stones.	Severe: large stones.	Moderate: cemented pan, slope.	Poor: large stones.
Kleinbush	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Washoe	Severe: percs slowly, poor filter.	Severe: seepage, slope, large stones.	Severe: large stones.	Moderate: slope.	Poor: small stones.
1331*:					
Sutcliff	Severe: percs slowly.	Severe: slope, large stones.	Severe: large stones.	Moderate: cemented pan, slope.	Poor: large stones.
Bundorf	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan, too clayey.	Severe: cemented pan.	Poor: area reclaim, too clayey, small stones.
Kleinbush	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
1340*:					
Hawsley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1340*:					
Ruhe	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage, too sandy.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, too sandy.
Bluewing	Severe: flooding, poor filter.	Severe: seepage, flooding, slope.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
1341*:					
Isolde	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Dune land.					
1342*:					
Isolde	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Playas.					
1344*:					
Isolde	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Toulon	Severe: poor filter.	Severe: seepage.	Severe: too sandy, large stones.	Slight	Poor: seepage, too sandy, small stones.
1345 Hawsley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
1350*:					
Stumble	Severe: poor filter.	Severe: seepage, slope.	Moderate: slope, too sandy.	Moderate: slope.	Poor: small stones.
Ruhe	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage, too sandy.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, too sandy.
Bluewing	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
1351 Stumble	Severe: poor filter.	Severe: seepage.	Moderate: too sandy.	Slight	Poor: small stones.
1360*:					
Trocken	Moderate: flooding, percs slowly, slope.	Severe: flooding, slope.	Moderate: flooding, slope, too sandy.	Moderate: flooding, slope.	Poor: seepage, small stones.
Stumble	Severe: poor filter.	Severe: seepage, slope.	Moderate: slope, too sandy.	Moderate: slope.	Poor: small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1360*:					
Bluewing	Severe: flooding, poor filter.	Severe: seepage, flooding, slope.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
1361*:					
Trocken	Moderate: flooding, percs slowly, slope.	Severe: flooding, slope.	Moderate: flooding, slope, too sandy.	Moderate: flooding, slope.	Poor: seepage, small stones.
Ruhe	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage, too sandy.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, too sandy.
Bluewing	Severe: flooding, poor filter.	Severe: seepage, flooding, slope.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
1362*:					
Trocken	Moderate: flooding, percs slowly, slope.	Severe: flooding, slope.	Moderate: flooding, slope, too sandy.	Moderate: flooding, slope.	Poor: seepage, small stones.
Badland.					
1363 Trocken	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding, too sandy.	Moderate: flooding.	Poor: seepage, small stones.
1364*:					
Trocken	Severe: slope.	Severe: flooding, slope.	Severe: slope.	Severe: slope.	Poor: seepage, small stones, slope.
Wrango	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
1370*:					
Singatse	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Fireball	Severe: slope.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Rednik	Severe: poor filter.	Severe: seepage, flooding, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1371*:					
Singatse	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Flex	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1371*:					
Acrelane	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
1372*:					
Singatse	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Isolde	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
1373*:					
Singatse	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Mizel	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Stingdorn	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, cemented pan, seepage.	Poor: area reclaim, seepage, small stones.
1374*:					
Singatse	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Fireball	Severe: slope.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Osobb	Severe: depth to rock, cemented pan, slope.	Severe: seepage, depth to rock, cemented pan.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, seepage, small stones.
1380*:					
Stingdorn	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, cemented pan, seepage.	Poor: area reclaim, seepage, small stones.
Singatse	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Rock outcrop.					
1390*:					
Pirouette	Severe: depth to rock, cemented pan.	Severe: seepage, depth to rock, cemented pan.	Severe: depth to rock, large stones.	Severe: depth to rock, cemented pan.	Poor: area reclaim, small stones.
Osobb	Severe: depth to rock, cemented pan, slope.	Severe: seepage, depth to rock, cemented pan.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, seepage, small stones.
Rock outcrop.					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1400*:					
Softscrabble	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope.
Gabica	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Burnborough	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
1401*:					
Softscrabble	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope.
Gabica	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Sumine	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
1410*:					
Burnborough	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: small stones, slope.
Ticino	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Gabica	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
1411*:					
Burnborough	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: small stones, slope.
Ticino	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Softscrabble	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope.
1420*:					
Barshaad	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
Fugawee	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1420*:					
Duckhill Variant---	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
1430*:					
Fraval-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Booford------------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Jumbo--------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: large stones, slope.
1431*:					
Fraval-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Hirschdale---------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Duckhill Variant---	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
1432*:					
Fraval-------------	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Hirschdale---------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Jumbo--------------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: large stones, slope.
1440---------------- Tallac	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: cemented pan, slope, large stones.	Severe: seepage, slope.	Poor: slope.
1441---------------- Tallac	Severe: slope.	Severe: seepage, slope.	Severe: cemented pan, slope.	Severe: seepage, slope.	Poor: large stones, slope.
1450*:					
Meiss--------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1450*:					
Sibelia	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Rock outcrop.					
1460*:					
Jorge	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Boomtown	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, small stones.
Fugawee	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
1470*:					
Carioca	Severe: wetness.	Severe: seepage, slope.	Severe: depth to rock.	Severe: seepage.	Poor: small stones.
Sibelia Variant	Severe: wetness, slope.	Severe: seepage, slope, wetness.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: large stones, slope.
Fugawee	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
1480*:					
Macareeno	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness.	Severe: seepage.	Poor: small stones.
Blackwell	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too sandy.	Severe: flooding, wetness.	Poor: too sandy, wetness.
Carioca	Severe: wetness, slope.	Severe: seepage, slope.	Severe: depth to rock, slope.	Severe: seepage, slope.	Poor: small stones, slope.
1490*:					
Arzo	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
Indiano	Severe: depth to rock, percs slowly, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Barnard	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan, too clayey.	Severe: cemented pan.	Poor: area reclaim, too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1510*:					
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Nosrac	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Old Camp	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
1520*:					
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Smallcone	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Cagle	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
1521*:					
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Yuko	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Lemm	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
1522*:					
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Pahrange	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Lemm	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
1530*:					
Bombadil	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Hefed	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1530*: Rubble land.					
1531*:					
Bombadil	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Hefed	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Fireball	Severe: slope.	Severe: seepage, slope, large stones.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
1540*:					
McQuarrie	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Tristan	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.
Arzo	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
1541*:					
McQuarrie	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Duco	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Tristan	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.
1550*:					
Skedaddle	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
Pahrange	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
Lemm	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
1570*:					
Bluewing	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1570*:					
Biddleman	Severe: poor filter.	Severe: seepage, slope.	Severe: too sandy.	Slight	Poor: seepage, too sandy, small stones.
Bundorf	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan, too clayey.	Severe: cemented pan.	Poor: area reclaim, too clayey, small stones.
1580*:					
Frodo	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, too clayey.	Severe: depth to rock, cemented pan.	Poor: area reclaim, too clayey, hard to pack.
Xman	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, hard to pack, slope.
Oppio	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, hard to pack.
1590 Ruhe	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock, flooding.	Severe: depth to rock, seepage, too sandy.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, too sandy.
1600*:					
Wrango	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
Ruhe	Severe: depth to rock, poor filter.	Severe: seepage, depth to rock, flooding.	Severe: depth to rock, seepage, too sandy.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition and does not eliminate the need for onsite investigation]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
101, 102, 106: Aquinas	Fair: low strength, thin layer, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, thin layer.
110: Jowec Variant	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
111*:				
Jowec Variant	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Greenbrae	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
120, 121: Doten	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt.
130: Greenbrae	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
131, 132: Greenbrae	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
134: Greenbrae	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
136: Greenbrae	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
140, 141, 142: Haybourne	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
150, 151: Doten Variant	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt.
160: Incy	Good	Probable	Improbable: too sandy.	Poor: too sandy.
161: Incy	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
171, 172, 173: Indian Creek	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
174: Indian Creek	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones.
175: Indian Creek	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
176*:				
Indian Creek	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
Reno	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Washoe	Fair: large stones.	Probable	Probable	Poor: area reclaim, small stones.
190, 191 Manogue	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
192 Manogue	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
200, 201, 202, 203 Northmore	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
210, 211 Luppino	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
221 Oppio	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
222 Oppio	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
223*:				
Oppio	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Rezave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones.
Rock outcrop.				
230 Cradlebaugh	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
240 Updike	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
241 Updike	Good	Probable	Probable	Poor: area reclaim.
250, 251, 252 Cassiro	Fair: area reclaim, thin layer, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
260*:				
Acrelane	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
260*: Rock outcrop.				
262---Acrelane	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
280---Wedekind	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
281---Wedekind	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
282---Wedekind	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
290---Verdico Variant	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
291---Verdico Variant	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
300---Surgem	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones.
301*:				
Surgem---	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope.
Rock outcrop.				
302*:				
Surgem---	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope.
Rock outcrop.				
310*:				
Risley---	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Rock outcrop.				
311*:				
Risley---	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Rock outcrop.				
312---Risley	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
313: Risley	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
314*:				
Risley	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Xman	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
341: Yuko	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
342*:				
Yuko	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Reywat	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
350: Mizel	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
351*:				
Mizel	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Skedaddle	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
Rock outcrop.				
360*. Pits				
370: Lemm	Good	Probable	Probable	Poor: small stones, area reclaim.
390: Duckhill	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
391*:				
Duckhill	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Hirschdale	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Fraval	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
400 Jubilee Variant	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
401 Jubilee Variant	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones, excess salt.
403 Jubilee Variant	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, excess salt.
410, 411 Ophir	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
420 Godecke	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, excess sodium.
423 Godecke Variant	Fair: thin layer, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
430, 431 Sagouspe Variant	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
440, 441 Jubilee	Poor: wetness, frost action.	Probable	Improbable: too sandy.	Poor: wetness.
442 Jubilee	Poor: wetness, frost action.	Probable	Improbable: too sandy.	Poor: wetness, too sandy, small stones.
443 Jubilee	Poor: wetness, frost action.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.
445 Jubilee	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
450 Voltaire	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
451, 452 Voltaire	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness, excess sodium.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
454------------------- Voltaire	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
455*:				
Voltaire-------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Truckee--------------	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: excess salt.
456------------------- Voltaire	Good----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
460, 461-------------- Surprise	Good----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
470------------------- Dalzell	Good----------------	Probable------------	Improbable: too sandy.	Poor: excess salt.
480, 482-------------- Holbrook	Good----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
490------------------- Graufels	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones.
491*:				
Graufels-------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, slope.
Rock outcrop.				
492------------------- Graufels	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, slope.
493*:				
Graufels-------------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Glenbrook------------	Poor: area reclaim.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, too sandy, small stones.
494------------------- Graufels	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
495*:				
Graufels-------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Glenbrook------------	Poor: area reclaim.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, too sandy, small stones.
Rock outcrop.				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
496*:				
Graufels	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Glenbrook	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, too sandy, small stones.
Haypress	Poor: slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: large stones, area reclaim, slope.
500, 504, 505 Mottsville	Good	Probable	Improbable: too sandy.	Poor: too sandy, small stones.
510 Settlemeyer	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
513*:				
Settlemeyer	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
Notus	Good	Probable	Probable	Poor: small stones, area reclaim.
514 Settlemeyer	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
520 Dressler	Fair: wetness.	Probable	Improbable: too sandy.	Poor: area reclaim, small stones.
530 Sagouspe	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
531 Sagouspe	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
532 Sagouspe	Good	Probable	Probable	Poor: too sandy, area reclaim.
550, 551 Leviathan	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
553 Leviathan	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
554 Leviathan	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
557 Leviathan	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
559------------------- Leviathan	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
570------------------- Turria	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
585*:				
Barnard---------------	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Trosi-----------------	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones.
590, 591-------------- Springmeyer	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
595------------------- Springmeyer	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
600, 601-------------- Idlewild	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
602------------------- Idlewild	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
612, 613-------------- Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
614------------------- Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
615------------------- Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
620, 621-------------- Orr	Good------------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
622------------------- Orr	Good------------------	Probable--------------	Probable--------------	Poor: small stones, area reclaim.
623, 624-------------- Orr	Good------------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
630, 631-------------- Fleischmann	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
632------------------- Fleischmann	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
640------------------- Notus	Good------------------	Probable--------------	Probable--------------	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
650 Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
651 Chalco	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
652, 653 Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
654*: Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Celeton Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
660, 661, 662 Oest	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
663 Oest	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
664 Oest	Good	Probable	Probable	Poor: small stones, area reclaim.
668 Oest	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
669 Oest	Good	Probable	Probable	Poor: small stones, area reclaim.
670 Galeppi	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: large stones.
671 Galeppi	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: large stones, slope.
673 Galeppi	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
674 Galeppi	Fair: low strength, frost action.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
676*: Galeppi	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
Barnard	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
681, 683: Reno	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
730: Stodick	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
731: Stodick	Poor: area reclaim, slope, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
740: Blackwell	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
752*:				
Toiyabe	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, too sandy, small stones.
Corbett	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: too sandy, small stones, slope.
Rock outcrop.				
753*:				
Toiyabe	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, too sandy, small stones.
Corbett	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: too sandy, small stones, slope.
Rock outcrop.				
754*:				
Toiyabe	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, too sandy, small stones.
Rock outcrop.				
756*:				
Toiyabe	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, too sandy, small stones.
Corbett	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: too sandy, small stones, slope.
Haypress	Poor: slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: large stones, area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
772 Booford	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
775 Booford	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
780, 782 Bieber	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
800 Truckee	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
802 Truckee	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
805 Truckee	Good	Probable	Probable	Poor: area reclaim, excess salt, excess sodium.
806 Truckee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
810, 812, 813 Rose Creek	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
820, 821 Marla	Fair: wetness.	Improbable: thin layer.	Improbable: too sandy.	Fair: too sandy, small stones.
830, 831 Fettic	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, excess sodium.
840*:				
Temo	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, too sandy, small stones.
Witefels	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, slope.
Rock outcrop.				
850 Washoe	Good	Probable	Probable	Poor: small stones, area reclaim.
861 Reywat	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
862 Reywat	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
863*:				
Reywat	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
870*:				
Xman	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Rock outcrop.				
871 Xman	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
872 Xman	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
873*:				
Xman	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
875*:				
Xman	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Zephan	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Mizel	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
876*:				
Xman	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Oppio	Poor: area reclaim, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Old Camp	Poor: area reclaim, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
877*:				
Xman	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Frodo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Mizel	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
880*:				
Zephan	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
Smallcone	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
881 Zephan	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
882 Zephan	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
890 Indiano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
891 Indiano	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
892*:				
Indiano	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Koontz	Poor: thin layer, slope.	Improbable: excess fines, large stones, thin layer.	Improbable: excess fines, large stones, thin layer.	Poor: slope.
Flex	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
893*:				
Indiano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
893*:				
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Cagle	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
894*:				
Indiano	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Skedaddle	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
895*:				
Indiano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Zephan	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
900 Flex	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
901 Flex	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
903 Flex	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
910, 911 Vamp	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
930 Old Camp	Poor: area reclaim, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
931*:				
Old Camp extremely stony	Poor: area reclaim, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
931*:				
Old Camp stony	Poor: area reclaim, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
Rock outcrop.				
932 Old Camp	Poor: area reclaim, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones.
960, 961, 962 Kayo	Good	Probable	Probable	Poor: small stones, area reclaim.
963 Kayo	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
971, 974 Aladshi	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
980 Koontz	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
982 Koontz	Poor: thin layer.	Improbable: excess fines, large stones, thin layer.	Improbable: excess fines, large stones, thin layer.	Poor: slope.
990*. Rock outcrop				
991*: Xeric Torriorthents.				
Urban land.				
992*. Playas				
993*. Haplaquolls				
994*: Badland.				
Chalco	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Verdico	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
996*: Dune land.				
Playas.				
997*. Badland				
998*. Beaches				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1010------------------- Gabica	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
1040------------------- Orr Variant	Fair: thin layer, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
1041------------------- Orr Variant	Fair: thin layer, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
1050------------------- Waspo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
1051------------------- Waspo	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
1052*:				
Waspo-----------------	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Rock outcrop.				
1054------------------- Waspo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
1060*:				
Witefels--------------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, slope.
Rock outcrop.				
1062*:				
Witefels--------------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, slope.
Rock outcrop.				
1080------------------- Inville Variant	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
1090------------------- Railcity	Poor: slope.	Probable-------------	Improbable: too sandy.	Poor: too sandy, small stones, area reclaim.
1091------------------- Railcity	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy, small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1100*: Graylock	Severe: slope.	Improbable: thin layer.	Improbable: too sandy.	Poor: slope, too sandy, small stones.
Temo	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, too sandy, small stones.
Rock outcrop.				
1120 Apmat	Fair: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: too sandy, area reclaim, small stones.
1121 Apmat	Fair: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: area reclaim, small stones.
1130 Dithod	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
1141, 1142, 1143 Bedell	Good	Probable	Improbable: too sandy.	Fair: too sandy, small stones, area reclaim.
1160, 1161 Jowec	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
1170, 1171 Wedertz	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
1172 Wedertz	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
1181*: Haypress	Poor: slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: large stones, area reclaim, slope.
Tanob	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
1182*: Haypress	Poor: slope, large stones.	Improbable: thin layer.	Improbable: thin layer.	Poor: large stones, area reclaim, slope.
Tanob	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1183*:				
Haypress	Poor: slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: large stones, area reclaim, slope.
Rock outcrop.				
1190, 1191 Spasprey	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
1192 Spasprey	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
1193, 1194 Spasprey	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
1200 Mellor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
1210 Linhart	Good	Probable	Improbable: too sandy.	Poor: too sandy, small stones, area reclaim.
1211 Linhart	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, small stones, area reclaim.
1220 Calpine	Good	Probable	Improbable: too sandy.	Fair: small stones.
1240 Pizene	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
1250, 1251 Rednik	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
1260*:				
Thulepah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Mosquet	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
1270*:				
Tristan	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Indiano	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lemm	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1271*:				
Tristan	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Barshaad	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Arzo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
1272*:				
Tristan	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Arzo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Reywat	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
1273*:				
Tristan	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Barshaad	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Frodo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
1290 Parran	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt.
1300 Rose Creek Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
1301 Rose Creek Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
1310 Bango	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, excess salt.
1320*:				
Osobb	Poor: area reclaim, large stones, slope.	Improbable: large stones.	Improbable: large stones.	Poor: area reclaim, small stones, slope.
Rezave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1320*:				
Fireball	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
1330*:				
Sutcliff	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.
Kleinbush	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Washoe	Fair: large stones.	Probable	Probable	Poor: area reclaim, small stones.
1331*:				
Sutcliff	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, area reclaim.
Bundorf	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Kleinbush	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
1340*:				
Hawsley	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Ruhe	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
Bluewing	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
1341*:				
Isolde	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Dune land.				
1342*:				
Isolde	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Playas.				
1344*:				
Isolde	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Toulon	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
1345 Hawsley	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1350*:				
Stumble	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Ruhe	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
Bluewing	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
1351 Stumble	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
1360*:				
Trocken	Good	Probable	Probable	Poor: small stones, area reclaim.
Stumble	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Bluewing	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
1361*:				
Trocken	Good	Probable	Probable	Poor: small stones, area reclaim.
Ruhe	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
Bluewing	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
1362*:				
Trocken	Good	Probable	Probable	Poor: small stones, area reclaim.
Badland.				
1363 Trocken	Good	Probable	Probable	Poor: small stones, area reclaim.
1364*:				
Trocken	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Wrango	Fair: large stones.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1370*:				
Singatse	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Fireball	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rednik	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
1371*:				
Singatse	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Flex	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Acrelane	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
1372*:				
Singatse	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Isolde	Good	Probable	Improbable: too sandy.	Poor: too sandy.
1373*:				
Singatse	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Mizel	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Stingdorn	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
1374*:				
Singatse	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Fireball	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1374*:				
Osobb	Poor: area reclaim, large stones.	Improbable: large stones.	Improbable: large stones.	Poor: area reclaim, small stones, slope.
1380*:				
Stingdorn	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
Singatse	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
1390*:				
Pirouette	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Osobb	Poor: area reclaim, large stones.	Improbable: large stones.	Improbable: large stones.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
1400*:				
Softscrabble	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Gabica	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
1401*:				
Softscrabble	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Gabica	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Sumine	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
1410*:				
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1410*:				
Ticino	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Gabica	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
1411*:				
Burnborough	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ticino	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Softscrabble	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
1420*:				
Barshaad	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Fugawee	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Duckhill Variant	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
1430*:				
Fraval	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Booford	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Jumbo	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
1431*:				
Fraval	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Hirschdale	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Duckhill Variant	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1432*:				
Fraval	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Hirschdale	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Jumbo	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
1440 Tallac	Poor: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
1441 Tallac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
1450*:				
Meiss	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Sibelia	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rock outcrop.				
1460*:				
Jorge	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Boomtown	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Fugawee	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
1470*:				
Carioca	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Sibelia Variant	Fair: large stones, wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Fugawee	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1480*:				
Macareeno	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Blackwell	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
Carioca	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
1490*:				
Arzo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Indiano	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Barnard	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
1510*:				
Cagle	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Nosrac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Old Camp	Poor: area reclaim, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
1520*:				
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Smallcone	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Cagle	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
1521*:				
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Yuko	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1521*:				
Lemm	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
1522*:				
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Pahrange	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lemm	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
1530*:				
Bombadil	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Hefed	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rubble land.				
1531*:				
Bombadil	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Hefed	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Fireball	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
1540*:				
McQuarrie	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Tristan	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Arzo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1541*:				
McQuarrie	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Duco	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Tristan	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
1550*:				
Skedaddle	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
Pahrange	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lemm	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
1570*:				
Bluewing	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
Biddleman	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
Bundorf	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
1580*:				
Frodo	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Xman	Poor: area reclaim, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Oppio	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
1590 Ruhe	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.
1600*:				
Wrango	Fair: large stones.	Improbable: small stones.	Probable	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1600*: Ruhe	Poor: area reclaim.	Probable	Probable	Poor: area reclaim, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition and does not eliminate the need for onsite investigation]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
101 Aquinas	Moderate: cemented pan, slope.	Moderate: thin layer, piping.	Deep to water	Soil blowing, percs slowly, cemented pan.	Cemented pan, soil blowing.
102, 106 Aquinas	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Soil blowing, percs slowly, cemented pan.	Slope, cemented pan, soil blowing.
110 Jowec Variant	Moderate: slope.	Slight	Deep to water	Soil blowing, percs slowly, slope.	Soil blowing.
111*:					
Jowec Variant	Severe: slope.	Slight	Deep to water	Soil blowing, percs slowly, slope.	Slope, soil blowing.
Greenbrae	Moderate: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, percs slowly, slope.	Too sandy, soil blowing.
120 Doten	Slight	Severe: hard to pack.	Deep to water	Slow intake, percs slowly.	Percs slowly, poor outlets.
121 Doten	Severe: slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Slope, percs slowly.
130 Greenbrae	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, percs slowly.	Soil blowing, percs slowly.
131 Greenbrae	Moderate: seepage.	Severe: piping.	Deep to water	Soil blowing, percs slowly.	Too sandy, soil blowing.
132 Greenbrae	Moderate: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, percs slowly, slope.	Too sandy, soil blowing.
134 Greenbrae	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, percs slowly, slope.	Soil blowing, percs slowly.
136 Greenbrae	Moderate: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, percs slowly, slope.	Too sandy, soil blowing.
140, 141 Haybourne	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, slope.	Too sandy.
142 Haybourne	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, slope.	Slope, too sandy.
150, 151 Doten Variant	Slight	Severe: excess salt.	Deep to water	Slow intake, percs slowly, erodes easily.	Erodes easily, percs slowly.
160 Incy	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
161 Incy	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
171 Indian Creek	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Large stones, cemented pan.
172 Indian Creek	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Droughty, soil blowing, percs slowly.	Large stones, cemented pan.
173 Indian Creek	Severe: seepage, cemented pan, slope.	Severe: seepage.	Deep to water	Droughty, soil blowing, percs slowly.	Slope, large stones, cemented pan.
174 Indian Creek	Severe: cemented pan.	Severe: hard to pack, large stones.	Deep to water	Large stones, percs slowly, cemented pan.	Large stones, cemented pan, percs slowly.
175 Indian Creek	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Large stones, cemented pan.
176*:					
Indian Creek	Severe: seepage, cemented pan, slope.	Severe: seepage.	Deep to water	Droughty, percs slowly.	Slope, large stones, cemented pan.
Reno	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Slope, large stones, cemented pan.
Washoe	Severe: slope.	Moderate: thin layer, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
190 Manogue	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Percs slowly.
191, 192 Manogue	Severe: slope.	Severe: hard to pack.	Deep to water	Slow intake, percs slowly, slope.	Slope, percs slowly.
200 Northmore	Moderate: seepage.	Slight	Deep to water	Soil blowing, percs slowly.	Soil blowing, percs slowly.
201, 202 Northmore	Moderate: seepage, slope.	Slight	Deep to water	Soil blowing, percs slowly, slope.	Soil blowing, percs slowly.
203 Northmore	Severe: slope.	Slight	Deep to water	Soil blowing, percs slowly, slope.	Slope, soil blowing, percs slowly.
210 Luppino	Severe: depth to rock.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Depth to rock.
211 Luppino	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
221, 222 Oppio	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
223*:					
Onpio	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Rezave	Severe: depth to rock.	Severe: thin layer.	Deep to water	Large stones, droughty, percs slowly.	Large stones, depth to rock.
Rock outcrop.					
230 Cradlebaugh	Severe: seepage.	Severe: wetness, excess salt.	Flooding, frost action, excess salt.	Wetness, flooding, excess salt.	Erodes easily, wetness.
240 Updike	Slight	Moderate: hard to pack, excess salt.	Deep to water	Percs slowly, erodes easily, excess salt.	Erodes easily, percs slowly.
241 Updike	Moderate: seepage.	Moderate: thin layer, hard to pack, excess salt.	Deep to water	Percs slowly, erodes easily, excess salt.	Erodes easily, percs slowly.
250, 251 Cassiro	Moderate: depth to rock, slope.	Moderate: thin layer.	Deep to water	Droughty, slope.	Favorable.
252 Cassiro	Severe: slope.	Moderate: thin layer.	Deep to water	Droughty, slope.	Slope.
260*:					
Acrelane	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
262 Acrelane	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
280, 281, 282 Wedekind	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
290, 291 Verdico Variant	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
300 Surgem	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
301*, 302*:					
Surgem	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, depth to rock.
Rock outcrop.					
310*, 311*:					
Risley	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Rock outcrop.					

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
312, 313----------- Risley	Severe: slope.	Severe: thin layer.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
314*:					
Risley------------	Severe: slope.	Severe: thin layer.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Xman--------------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Rock outcrop.					
341---------------- Yuko	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Depth to rock, slope.	Slope, depth to rock, erodes easily.
342*:					
Yuko--------------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Depth to rock, slope.	Slope, depth to rock, erodes easily.
Reywat------------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
Rock outcrop.					
350---------------- Mizel	Severe: depth to rock, slope.	Slight-------------	Deep to water----	Depth to rock, slope.	Slope, depth to rock.
351*:					
Mizel-------------	Severe: depth to rock, slope.	Slight-------------	Deep to water----	Depth to rock, slope.	Slope, depth to rock.
Skedaddle---------	Severe: depth to rock, slope.	Severe: large stones.	Deep to water----	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
360*. Pits					
370---------------- Lemm	Severe: seepage.	Severe: thin layer.	Deep to water----	Droughty, slope.	Favorable.
390---------------- Duckhill	Severe: depth to rock, slope.	Moderate: large stones.	Deep to water----	Depth to rock, slope.	Slope, large stones, depth to rock.
391*:					
Duckhill----------	Severe: depth to rock, slope.	Moderate: large stones.	Deep to water----	Depth to rock, slope.	Slope, large stones, depth to rock.
Hirschdale--------	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Fraval------------	Severe: slope.	Severe: large stones.	Deep to water----	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
400 Jubilee Variant	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave, excess salt.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.
401 Jubilee Variant	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.
403 Jubilee Variant	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness	Wetness, too sandy.
410 Ophir	Severe: seepage.	Severe: seepage, wetness.	Slope, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.
411 Ophir	Severe: seepage.	Severe: seepage, wetness.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.
420 Godecke	Slight	Severe: excess sodium, excess salt.	Percs slowly, excess salt, excess sodium.	Wetness, fast intake, soil blowing.	Wetness, soil blowing, percs slowly.
423 Godecke Variant	Moderate: cemented pan.	Moderate: thin layer, excess salt.	Deep to water	Fast intake, soil blowing, percs slowly.	Soil blowing, percs slowly.
430, 431 Sagouspe Variant	Severe: seepage.	Severe: piping, wetness.	Frost action, cutbanks cave.	Wetness, droughty, fast intake.	Erodes easily, wetness, too sandy.
440, 441 Jubilee	Severe: seepage.	Severe: piping, wetness.	Wetness, cutbanks cave, poor outlets.	Wetness, seepage.	Wetness, poor outlets.
442, 443 Jubilee	Severe: seepage.	Severe: piping, wetness.	Wetness, cutbanks cave, poor outlets.	Wetness, fast intake, droughty.	Wetness, poor outlets.
445 Jubilee	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing	Too sandy, soil blowing.
450, 451 Voltaire	Slight	Severe: wetness.	Percs slowly, frost action, cutbanks cave.	Wetness, percs slowly.	Wetness, too sandy, percs slowly.
452 Voltaire	Slight	Severe: wetness, excess sodium, excess salt.	Percs slowly, frost action, cutbanks cave.	Wetness, percs slowly, excess sodium.	Erodes easily, wetness, too sandy.
454 Voltaire	Slight	Moderate: piping.	Deep to water	Slow intake, percs slowly.	Too sandy, percs slowly.
455*:					
Voltaire	Slight	Moderate: piping.	Deep to water	Slow intake, percs slowly.	Too sandy, percs slowly.
Truckee	Slight	Severe: piping.	Deep to water	Erodes easily, excess salt.	Erodes easily.
456 Voltaire	Severe: seepage.	Moderate: thin layer, wetness.	Deep to water	Percs slowly, erodes easily.	Erodes easily, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions
460----------------- Surprise	Severe: seepage.	Severe: seepage.	Deep to water----	Droughty, fast intake, slope.	Soil blowing.
461----------------- Surprise	Severe: seepage.	Severe: seepage.	Deep to water----	Droughty, slope.	Soil blowing.
470----------------- Dalzell	Severe: seepage.	Severe: seepage, piping.	Deep to water----	Fast intake, soil blowing, cemented pan.	Cemented pan.
480----------------- Holbrook	Severe: seepage.	Severe: seepage.	Deep to water----	Droughty, fast intake, slope.	Too sandy.
482----------------- Holbrook	Severe: seepage.	Severe: seepage.	Deep to water----	Droughty, fast intake, slope.	Large stones, too sandy.
490----------------- Graufels	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Droughty, fast intake, depth to rock.	Slope, depth to rock, too sandy.
491*:					
Graufels----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Droughty, fast intake, depth to rock.	Slope, depth to rock, too sandy.
Rock outcrop.					
492----------------- Graufels	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Droughty, fast intake, depth to rock.	Slope, depth to rock, too sandy.
493*:					
Graufels----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Droughty, depth to rock.	Slope, depth to rock, too sandy.
Glenbrook---------	Severe: depth to rock, slope.	Severe: seepage.	Deep to water----	Droughty, fast intake, soil blowing.	Slope, large stones, depth to rock.
494----------------- Graufels	Severe: seepage.	Severe: seepage.	Deep to water----	Droughty, depth to rock.	Depth to rock, too sandy.
495*:					
Graufels----------	Severe: seepage.	Severe: seepage.	Deep to water----	Droughty, depth to rock.	Depth to rock, too sandy.
Glenbrook---------	Severe: depth to rock, slope.	Severe: seepage.	Deep to water----	Droughty, fast intake, soil blowing.	Slope, large stones, depth to rock.
Rock outcrop.					
496*:					
Graufels----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Droughty, depth to rock.	Slope, depth to rock, too sandy.
Glenbrook---------	Severe: depth to rock, slope.	Severe: seepage.	Deep to water----	Droughty, fast intake, soil blowing.	Slope, large stones, depth to rock.
Haypress----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Large stones, slope, droughty.	Large stones, slope, too sandy.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
500---------------- Mottsville	Severe: seepage.	Severe: seepage, piping.	Deep to water----	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
504---------------- Mottsville	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water----	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
505---------------- Mottsville	Severe: seepage.	Severe: seepage, piping.	Deep to water----	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
510---------------- Settlemeyer	Moderate: seepage.	Severe: piping, wetness.	Frost action-----	Wetness----------	Erodes easily, wetness, too sandy.
513*:					
Settlemeyer------	Moderate: seepage.	Severe: piping, wetness.	Frost action-----	Wetness----------	Erodes easily, wetness, too sandy.
Notus------------	Severe: seepage.	Severe: seepage.	Deep to water----	Droughty, fast intake, soil blowing.	Large stones, too sandy, soil blowing.
514---------------- Settlemeyer	Moderate: seepage, slope.	Severe: piping, wetness.	Frost action, slope.	Wetness, slope.	Erodes easily, wetness, too sandy.
520---------------- Dressler	Severe: seepage.	Severe: seepage.	Large stones, frost action, slope.	Wetness, droughty, fast intake.	Large stones, wetness, too sandy.
530---------------- Sagouspe	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave.	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
531---------------- Sagouspe	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave.	Soil blowing-----	Too sandy, soil blowing.
532---------------- Sagouspe	Severe: seepage.	Severe: seepage, piping.	Cutbanks cave.	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
550---------------- Leviathan	Slight------------	Moderate: large stones.	Deep to water----	Droughty---------	Large stones.
551---------------- Leviathan	Moderate: slope.	Moderate: large stones.	Deep to water----	Droughty, slope.	Large stones.
553---------------- Leviathan	Severe: slope.	Moderate: large stones.	Deep to water----	Droughty, slope.	Slope, large stones.
554---------------- Leviathan	Moderate: slope.	Moderate: large stones.	Deep to water----	Droughty, percs slowly.	Large stones, percs slowly.
557---------------- Leviathan	Severe: slope.	Moderate: large stones.	Deep to water----	Droughty, percs slowly.	Slope, large stones, percs slowly.
559---------------- Leviathan	Moderate: slope.	Moderate: large stones.	Deep to water----	Large stones, droughty, percs slowly.	Large stones, percs slowly.
570---------------- Turria	Moderate: seepage.	Severe: piping.	Deep to water----	Erodes easily----	Erodes easily.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
585*:					
Barnard	Moderate: cemented pan, slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Large stones, cemented pan.
Trosi	Severe: cemented pan.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Large stones, cemented pan.
590 Springmeyer	Moderate: seepage.	Slight	Deep to water	Percs slowly	Favorable.
591 Springmeyer	Moderate: seepage, slope.	Slight	Deep to water	Percs slowly, slope.	Favorable.
595 Springmeyer	Moderate: seepage.	Slight	Deep to water	Percs slowly	Too sandy.
600 Idlewild	Slight	Slight	Deep to water	Percs slowly	Percs slowly.
601 Idlewild	Slight	Slight	Deep to water	Soil blowing, percs slowly.	Soil blowing, percs slowly.
602 Idlewild	Slight	Moderate: wetness.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.
612 Verdico	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock.	Depth to rock.
613, 614 Verdico	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock.	Slope, depth to rock.
615 Verdico	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Soil blowing, percs slowly, depth to rock.	Depth to rock, soil blowing.
620, 621 Orr	Moderate: seepage, slope.	Slight	Deep to water	Slope	Favorable.
622 Orr	Severe: seepage.	Severe: seepage.	Deep to water	Slope	Too sandy.
623, 624 Orr	Moderate: seepage.	Slight	Deep to water	Favorable	Favorable.
630, 631 Fleischmann	Moderate: cemented pan, slope.	Severe: hard to pack.	Deep to water	Percs slowly, cemented pan, slope.	Cemented pan, percs slowly.
632 Fleischmann	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, cemented pan, slope.	Slope, cemented pan, percs slowly.
640 Notus	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Large stones, too sandy, soil blowing.
650, 651 Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
652 Chalco	Severe: depth to rock.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
653 Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
654*:					
Chalco	Severe: depth to rock.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock, percs slowly.
Celeton Variant	Severe: depth to rock.	Slight	Deep to water	Depth to rock, slope.	Depth to rock.
660, 661, 662 Oest	Moderate: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Large stones.
663, 664 Oest	Severe: slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones.
668 Oest	Severe: slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
669 Oest	Moderate: seepage.	Severe: seepage.	Deep to water	Droughty	Large stones.
670 Galeppi	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Soil blowing, slope.	Soil blowing.
671, 673 Galeppi	Severe: slope.	Severe: thin layer.	Deep to water	Soil blowing, slope.	Slope, soil blowing.
674 Galeppi	Severe: slope.	Severe: large stones.	Slope	Large stones, droughty, slope.	Large stones.
676*:					
Galeppi	Severe: slope.	Severe: thin layer.	Deep to water	Large stones, droughty, slope.	Slope, soil blowing.
Barnard	Moderate: cemented pan, slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Large stones, cemented pan.
681 Reno	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Slope, large stones, cemented pan.
683 Reno	Moderate: depth to rock, cemented pan, slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Large stones, cemented pan.
730, 731 Stodick	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
740 Blackwell	Slight	Severe: piping, wetness.	Flooding, frost action.	Wetness	Wetness, too sandy.
752*, 753*:					
Toiyabe	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
752*, 753*:					
Corbett	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, depth to rock.	Slope, depth to rock, too sandy.
Rock outcrop.					
754*:					
Toiyabe	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, large stones, depth to rock.
Rock outcrop.					
756*:					
Toiyabe	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, large stones, depth to rock.
Corbett	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, depth to rock.	Slope, depth to rock, too sandy.
Haypress	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, slope, droughty.	Large stones, slope, too sandy.
772, 775 Booford	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
780 Bieber	Severe: cemented pan.	Severe: seepage.	Deep to water	Percs slowly, cemented pan.	Large stones, cemented pan.
782 Bieber	Severe: cemented pan, slope.	Severe: seepage.	Deep to water	Percs slowly, cemented pan, slope.	Slope, large stones, cemented pan.
800 Truckee	Slight	Severe: piping.	Frost action	Wetness, erodes easily.	Erodes easily, wetness.
802 Truckee	Slight	Severe: piping, excess salt.	Frost action, excess salt.	Wetness, erodes easily, excess salt.	Erodes easily, wetness.
805 Truckee	Severe: seepage.	Severe: seepage.	Deep to water	Excess salt	Too sandy.
806 Truckee	Severe: seepage.	Severe: seepage, piping, excess salt.	Frost action, cutbanks cave, excess salt.	Excess salt	Favorable.
810 Rose Creek	Severe: seepage.	Severe: piping.	Deep to water	Favorable	Too sandy.
812 Rose Creek	Severe: seepage.	Severe: piping.	Deep to water	Fast intake, soil blowing.	Too sandy, soil blowing.
813 Rose Creek	Severe: seepage.	Severe: piping.	Deep to water	Favorable	Too sandy.
820 Marla	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, slope, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
821 Marla	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.
830, 831 Fettic	Slight	Severe: wetness, excess sodium, excess salt.	Percs slowly, frost action, cutbanks cave.	Wetness, percs slowly.	Erodes easily, wetness, too sandy.
840*:					
Temo	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, depth to rock.	Slope, large stones, depth to rock.
Witefels	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock, too sandy.
Rock outcrop.					
850 Washoe	Moderate: seepage.	Moderate: thin layer, large stones.	Deep to water	Droughty	Large stones.
861, 862 Reywat	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
863*:					
Reywat	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
Rock outcrop.					
870*:					
Xman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Rock outcrop.					
871, 872 Xman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
873*:					
Xman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Rock outcrop.					
875*:					
Xman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Zephan	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
Mizel	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
876*:					
Xman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Oppio	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock.
Old Camp	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
877*:					
Xman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Frodo	Severe: depth to rock, cemented pan, slope.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, large stones, depth to rock.
Mizel	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
880*:					
Zephan	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
Smallcone	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
881, 882 Zephan	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
890, 891 Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
892*:					
Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
Koontz	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, rooting depth, slope.	Large stones, small stones, slope.
Flex	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
893*:					
Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions
893*:					
Cagle	Severe: slope.	Moderate: thin layer, large stones.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
894*:					
Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Skedaddle	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
895*:					
Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
Zephan	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
900, 901, 903 Flex	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
910 Vamp	Moderate: seepage, cemented pan.	Severe: piping, excess salt.	Deep to water	Soil blowing, cemented pan, excess salt.	Cemented pan.
911 Vamp	Moderate: seepage, cemented pan.	Severe: piping, excess salt.	Deep to water	Cemented pan, excess salt.	Cemented pan, erodes easily.
930 Old Camp	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
931*:					
Old Camp extremely stony	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Old Camp stony	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
932 Old Camp	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
960, 961, 962 Kayo	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Too sandy.
963 Kayo	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, too sandy.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
971: Aladshi	Severe: seepage.	Severe: seepage.	Deep to water	Soil blowing, slope.	Too sandy, soil blowing.
974: Aladshi	Severe: seepage.	Severe: seepage.	Deep to water	Slope	Too sandy.
980: Koontz	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
982: Koontz	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, rooting depth, slope.	Large stones, small stones, slope.
990*. Rock outcrop					
991*: Xeric Torriorthents.					
Urban land.					
992*. Playas					
993*. Haplaquolls					
994*: Badland.					
Chalco	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Verdico	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock.	Slope, depth to rock.
996*: Dune land.					
Playas.					
997*. Badland					
998*. Beaches					
1010: Gabica	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.
1040: Orr Variant	Slight	Severe: piping.	Deep to water	Favorable	Erodes easily.
1041: Orr Variant	Slight	Severe: piping.	Deep to water	Soil blowing	Erodes easily, soil blowing.
1050, 1051: Waspo	Severe: slope.	Severe: thin layer.	Deep to water	Slow intake, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.
1052*: Waspo	Severe: slope.	Severe: thin layer.	Deep to water	Slow intake, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1052*: Rock outcrop.					
1054: Waspo	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Slow intake, percs slowly, depth to rock.	Depth to rock, percs slowly.
1060*, 1062*: Witefels	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock, too sandy.
Rock outcrop.					
1080: Inville Variant	Moderate: slope.	Moderate: wetness.	Frost action, slope.	Wetness, slope.	Wetness.
1090, 1091: Railcity	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones, too sandy.
1100*: Graylock	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, slope.	Erodes easily, slope, too sandy.
Temo	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
1120: Apmat	Severe: seepage.	Severe: large stones.	Deep to water	Large stones, droughty, fast intake.	Large stones.
1121: Apmat	Severe: seepage.	Severe: large stones.	Deep to water	Large stones, droughty.	Large stones.
1130: Dithod	Slight	Severe: piping.	Deep to water	Favorable	Favorable.
1141, 1142: Bedell	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.	Soil blowing.
1143: Bedell	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, soil blowing.
1160, 1161: Jowec	Moderate: seepage.	Severe: piping.	Deep to water	Percs slowly, erodes easily.	Erodes easily.
1170, 1171: Wedertz	Severe: seepage.	Severe: seepage.	Deep to water	Soil blowing, slope.	Too sandy, soil blowing.
1172: Wedertz	Severe: seepage.	Severe: seepage.	Deep to water	Fast intake, soil blowing, slope.	Too sandy, soil blowing.
1181*, 1182*: Haypress	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, slope, droughty.	Large stones, slope, too sandy.
Tanob	Severe: slope.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock, soil blowing.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1181*, 1182*: Rock outcrop.					
1183*: Haypress	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, slope, droughty.	Large stones, slope, too sandy.
Rock outcrop.					
1190 Spasprey	Moderate: seepage, cemented pan.	Severe: seepage, piping.	Deep to water	Droughty, soil blowing, cemented pan.	Cemented pan, too sandy, soil blowing.
1191, 1192, 1193 Spasprey	Moderate: seepage, cemented pan, slope.	Severe: seepage, piping.	Deep to water	Droughty, soil blowing, cemented pan.	Cemented pan, too sandy, soil blowing.
1194 Spasprey	Moderate: seepage, cemented pan, slope.	Severe: seepage, piping.	Deep to water	Cemented pan	Cemented pan, too sandy.
1200 Mellor	Slight	Severe: excess salt.	Deep to water	Percs slowly, erodes easily, excess salt.	Erodes easily, percs slowly.
1210 Linhart	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, soil blowing, slope.	Too sandy, soil blowing.
1211 Linhart	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, soil blowing, slope.	Slope, too sandy, soil blowing.
1220 Calpine	Severe: seepage.	Severe: piping.	Deep to water	Droughty, soil blowing, slope.	Soil blowing.
1240 Pizene	Severe: seepage.	Severe: piping.	Deep to water	Slope, excess salt.	Favorable.
1250 Rednik	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Large stones, too sandy.
1251 Rednik	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones, too sandy.
1260*: Thulepah	Severe: slope.	Slight	Deep to water	Percs slowly, slope.	Slope, percs slowly.
Mosquet	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, percs slowly, depth to rock.	Slope, large stones, depth to rock.
1270*: Tristan	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Indiano	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions
1270*:					
Lemm	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Droughty, slope.	Slope.
1271*:					
Tristan	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Barshaad	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.
Arzo	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
1272*:					
Tristan	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Arzo	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Reywat	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
1273*:					
Tristan	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Barshaad	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.
Frodo	Severe: depth to rock, cemented pan, slope.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, large stones, depth to rock.
1290 Parran	Slight	Severe: excess salt.	Percs slowly, frost action, excess salt.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.
1300 Rose Creek Variant	Slight	Severe: piping.	Deep to water	Soil blowing	Erodes easily, too sandy, soil blowing.
1301 Rose Creek Variant	Slight	Severe: piping.	Deep to water	Fast intake, soil blowing.	Erodes easily, too sandy, soil blowing.
1310 Bango	Moderate: slope.	Severe: piping.	Deep to water	Slope, excess salt.	Erodes easily.
1320*:					
Osobb	Severe: depth to rock, cemented pan, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1320*:					
Rezave	Severe: depth to rock.	Severe: thin layer.	Deep to water	Large stones, droughty, percs slowly.	Large stones, depth to rock.
Fireball	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
1330*:					
Sutcliff	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, erodes easily.
Kleinbush	Moderate: slope.	Moderate: hard to pack, excess salt.	Deep to water	Fast intake, percs slowly, slope.	Erodes easily, percs slowly.
Washoe	Severe: slope.	Moderate: thin layer, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
1331*:					
Sutcliff	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, erodes easily.
Bundorf	Severe: cemented pan, slope.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Slope, large stones, cemented pan.
Kleinbush	Moderate: slope.	Moderate: hard to pack, excess salt.	Deep to water	Fast intake, percs slowly, slope.	Erodes easily, percs slowly.
1340*:					
Hawsley	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
Ruhe	Severe: seepage, depth to rock.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Large stones, depth to rock.
Bluewing	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.	Slope, large stones, too sandy.
1341*:					
Isolde	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
Dune land.					
1342*:					
Isolde	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
Playas.					
1344*:					
Isolde	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1344*:					
Toulon	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Large stones, too sandy.
1345 Hawsley	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
1350*:					
Stumble	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
Ruhe	Severe: seepage, depth to rock.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Large stones, depth to rock.
Bluewing	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.	Large stones, too sandy.
1351 Stumble	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
1360*:					
Trocken	Severe: slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones, too sandy.
Stumble	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.
Bluewing	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.	Slope, large stones, too sandy.
1361*:					
Trocken	Severe: slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones, too sandy.
Ruhe	Severe: seepage, depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, fast intake.	Slope, large stones, depth to rock.
Bluewing	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.	Slope, large stones, too sandy.
1362*:					
Trocken	Severe: slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones, too sandy.
Badland.					
1363 Trocken	Moderate: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Large stones, too sandy.
1364*:					
Trocken	Severe: slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones, too sandy.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
1364*:					
Wrango-----------	Severe: seepage.	Severe: seepage.	Deep to water----	Large stones, droughty, fast intake.	Large stones, too sandy.
1370*:					
Singatse---------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Fireball---------	Severe: seepage, slope.	Severe: large stones.	Deep to water----	Large stones, droughty, slope.	Slope, large stones.
Rednik-----------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Large stones, droughty, slope.	Slope, large stones, too sandy.
1371*:					
Singatse---------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Flex-------------	Severe: depth to rock, slope.	Slight------------	Deep to water----	Droughty, depth to rock, slope.	Slope, depth to rock.
Acrelane---------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
1372*:					
Singatse---------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Isolde-----------	Severe: seepage.	Severe: seepage, piping.	Deep to water----	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
1373*:					
Singatse---------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Mizel------------	Severe: depth to rock, slope.	Slight------------	Deep to water----	Depth to rock, slope.	Slope, depth to rock.
Stingdorn--------	Severe: depth to rock, cemented pan, slope.	Severe: seepage.	Deep to water----	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
1374*:					
Singatse---------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Droughty, depth to rock, slope.	Slope, large stones, depth to rock.
Fireball---------	Severe: seepage, slope.	Severe: large stones.	Deep to water----	Large stones, droughty, slope.	Slope, large stones.
Osobb------------	Severe: depth to rock, cemented pan, slope.	Severe: seepage, large stones.	Deep to water----	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1380*:					
Stingdorn	Severe: depth to rock, cemented pan, slope.	Severe: seepage.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Singatse	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock. slope.	Slope, large stones, depth to rock.
Rock outcrop.					
1390*:					
Pirouette	Severe: depth to rock, cemented pan.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.	Large stones, depth to rock.
Osobb	Severe: depth to rock, cemented pan, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Rock outcrop.					
1400*:					
Softscrabble	Severe: slope.	Severe: large stones.	Deep to water	Large stones, percs slowly, slope.	Slope, large stones, percs slowly.
Gabica	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.
1401*:					
Softscrabble	Severe: slope.	Severe: large stones.	Deep to water	Large stones, percs slowly, slope.	Slope, large stones, percs slowly.
Gabica	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.
Sumine	Severe: slope.	Severe: large stones.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
1410*:					
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.
Ticino	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.
Gabica	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Slope, large stones, depth to rock.
1411*:					
Burnborough	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, slope.	Slope, large stones.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1411*:					
Ticino	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.
Softscrabble	Severe: slope.	Severe: large stones.	Deep to water	Large stones, percs slowly, slope.	Slope, large stones, percs slowly.
1420*:					
Barshaad	Severe: slope.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Slope, depth to rock, erodes easily.
Fugawee	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
Duckhill Variant	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
1430*:					
Fraval	Severe: slope.	Severe: large stones.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
Booford	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Jumbo	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, slope.	Slope, large stones.
1431*:					
Fraval	Severe: slope.	Severe: large stones.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
Hirschdale	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Duckhill Variant	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
1432*:					
Fraval	Severe: slope.	Severe: large stones.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
Hirschdale	Severe: slope.	Moderate: thin layer, hard to pack, large stones.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Jumbo	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, slope.	Slope, large stones.
1440 Tallac	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty.	Slope, large stones.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
1441-------------- Tallac	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water----	Large stones, droughty.	Slope, large stones.
1450*: Meiss------------	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water----	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.
Sibelia----------	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water----	Large stones, droughty, slope.	Slope, large stones.
Rock outcrop.					
1460*: Jorge------------	Severe: seepage, slope.	Severe: seepage.	Deep to water----	Droughty, slope.	Slope, large stones.
Boomtown---------	Severe: slope.	Moderate: hard to pack.	Deep to water----	Percs slowly, slope.	Slope, percs slowly.
Fugawee----------	Severe: slope.	Severe: piping.	Deep to water----	Depth to rock, slope.	Slope, depth to rock.
1470*: Carioca----------	Severe: seepage, slope.	Moderate: thin layer, large stones.	Deep to water----	Droughty, slope.	Slope, large stones.
Sibelia Variant--	Severe: seepage, slope.	Moderate: piping, large stones, wetness.	Large stones, slope.	Large stones, wetness, droughty.	Slope, large stones, wetness.
Fugawee----------	Severe: slope.	Severe: piping.	Deep to water----	Depth to rock, slope.	Slope, depth to rock.
1480*: Macareeno--------	Severe: slope.	Moderate: wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, large stones, wetness.
Blackwell---------	Slight------------	Severe: piping, wetness.	Flooding, frost action.	Wetness----------	Wetness, too sandy.
Carioca----------	Severe: seepage, slope.	Moderate: thin layer, large stones.	Deep to water----	Droughty, slope.	Slope, large stones.
1490*: Arzo-------------	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
Indiano----------	Severe: slope.	Severe: thin layer.	Deep to water----	Depth to rock, slope.	Slope, large stones, depth to rock.
Barnard----------	Moderate: cemented pan, slope.	Severe: thin layer.	Deep to water----	Percs slowly, cemented pan, slope.	Large stones, cemented pan.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1510*:					
Cagle	Severe: slope.	Moderate: thin layer, large stones.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
Nosrac	Severe: slope.	Moderate: large stones.	Deep to water	Slope	Slope, large stones.
Old Camp	Severe: depth to rock, slope.	Severe: large stones, thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
1520*:					
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Smallcone	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
Cagle	Severe: slope.	Moderate: thin layer, large stones.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.
1521*:					
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Yuko	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.
Lemm	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Droughty, slope.	Slope.
1522*:					
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Pahrange	Severe: slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Lemm	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Droughty, slope.	Slope.
1530*:					
Bombadil	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
Hefed	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones, too sandy.
Rubble land.					
1531*:					
Bombadil	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1531*:					
Hefed	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones, too sandy.
Fireball	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
1540*:					
McQuarrie	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
Tristan	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
Arzo	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
1541*:					
McQuarrie	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, large stones, depth to rock.
Duco	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Tristan	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.
1550*:					
Skedaddle	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Pahrange	Severe: slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.
Lemm	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Droughty, slope.	Slope.
1570*:					
Bluewing	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.	Large stones, too sandy.
Biddleman	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Erodes easily, too sandy.
Bundorf	Severe: cemented pan.	Severe: thin layer.	Deep to water	Percs slowly, cemented pan, slope.	Large stones, cemented pan.
1580*:					
Frodo	Severe: depth to rock, cemented pan.	Severe: thin layer.	Deep to water	Droughty, percs slowly, depth to rock.	Large stones, depth to rock.
Xman	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, large stones, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions
1580*:					
Oppio------------	Severe: slope.	Severe: thin layer.	Deep to water----	Percs slowly, depth to rock, slope.	Slope, depth to rock, percs slowly.
1590-------------- Ruhe	Severe: seepage, depth to rock.	Severe: seepage.	Deep to water----	Droughty, fast intake, soil blowing.	Large stones, depth to rock.
1600*:					
Wrango-----------	Severe: seepage.	Severe: seepage.	Deep to water----	Large stones, droughty, fast intake.	Large stones, too sandy.
Ruhe-------------	Severe: seepage, depth to rock.	Severe: seepage.	Deep to water----	Droughty, fast intake, soil blowing.	Large stones, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
101, 102 Aquinas	0-7	Sandy loam	SM	A-2, A-4	0-5	90-100	85-95	50-65	25-40	---	NP
	7-37	Sandy clay loam, clay loam.	SC, CL	A-6	0-5	90-100	85-95	70-95	40-75	25-40	10-25
	37-46	Cemented	---	---	---	---	---	---	---	---	---
	46-60	Variable	---	---	---	---	---	---	---	---	---
106 Aquinas	0-1	Sandy loam	SM	A-2, A-4	0-5	90-100	85-95	50-65	25-40	---	NP
	1-30	Sandy clay loam, clay loam.	SC, CL	A-6	0-5	90-100	85-95	70-95	40-75	25-40	10-25
	30-36	Cemented	---	---	---	---	---	---	---	---	---
	36-60	Variable	---	---	---	---	---	---	---	---	---
110 Jowec Variant	0-10	Sandy loam	SM	A-2	0-5	90-100	90-100	50-60	15-35	---	NP
	10-20	Clay, sandy clay	SC, CL, CH	A-6, A-7	0	90-100	90-100	80-100	40-75	35-55	20-30
	20-66	Stratified sandy loam to clay loam.	SC	A-2, A-6	0	90-100	90-100	55-80	30-50	20-35	10-20
111*:											
Jowec Variant	0-12	Sandy loam	SM	A-2	0-5	90-100	90-100	50-60	15-35	---	NP
	12-22	Clay, sandy clay	SC, CL, CH	A-6, A-7	0	90-100	90-100	80-100	40-75	35-55	20-30
	22-60	Stratified sandy loam to clay loam.	SC	A-2, A-6	0	90-100	90-100	55-80	30-50	20-35	10-20
Greenbrae	0-10	Sandy loam	SM	A-2	0	95-100	90-100	55-75	20-35	20-25	NP-5
	10-28	Clay loam, sandy clay loam.	SC, CL	A-6, A-7	0	95-100	90-100	70-85	40-65	35-45	15-25
	28-63	Stratified coarse sand to gravelly loam.	SM	A-2	0	90-100	75-100	45-60	25-35	---	NP
120, 121 Doten	0-21	Silty clay	CH, MH	A-7	0	100	100	95-100	85-100	50-60	20-30
	21-62	Silty clay, clay	CH, MH	A-7	0	100	100	95-100	85-100	50-60	20-30
130 Greenbrae	0-5	Sandy loam	SM	A-2, A-4	0	95-100	90-100	60-70	30-40	15-25	NP-5
	5-22	Sandy clay loam	SC, CL	A-6	0	95-100	95-100	80-90	35-55	30-40	10-20
	22-51	Sandy loam	SM	A-2	0	95-100	85-100	55-75	25-35	---	NP
	51-68	Silty clay loam	CL, CH	A-7	0	100	100	90-100	80-95	40-55	25-35
131 Greenbrae	0-10	Sandy loam	SM	A-2	0	95-100	90-100	55-75	20-35	20-25	NP-5
	10-30	Clay loam, sandy clay loam.	SC, CL	A-6, A-7	0	95-100	90-100	70-85	40-65	35-45	15-25
	30-63	Stratified coarse sand to gravelly loam.	SM	A-2	0	90-100	75-100	45-60	25-35	---	NP
132 Greenbrae	0-8	Sandy loam	SM	A-2	0	95-100	90-100	55-75	20-35	20-25	NP-5
	8-28	Clay loam, sandy clay loam.	SC, CL	A-6, A-7	0	95-100	90-100	70-85	40-65	35-45	15-25
	28-63	Stratified coarse sand to gravelly loam.	SM	A-2	0	90-100	75-100	45-60	25-35	---	NP
134 Greenbrae	0-6	Sandy loam	SM	A-2, A-4	0	95-100	90-100	60-70	30-40	15-25	NP-5
	6-24	Sandy clay loam	SC, CL	A-6	0	95-100	95-100	80-90	35-55	30-40	10-20
	24-52	Sandy loam	SM	A-2	0	95-100	85-100	55-75	25-35	---	NP
	52-68	Silty clay loam	CL, CH	A-7	0	100	100	90-100	80-95	40-55	25-35
136 Greenbrae	0-12	Sandy loam	SM	A-2	0	95-100	90-100	55-75	20-35	20-25	NP-5
	12-32	Clay loam, sandy clay loam.	SC, CL	A-6, A-7	0	95-100	90-100	70-85	40-65	35-45	15-25
	32-63	Stratified coarse sand to gravelly loam.	SM	A-2	0	90-100	75-100	45-60	25-35	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
140---------------- Haybourne	0-10	Loamy sand--------	SP-SM, SM	A-1	0	90-100	75-95	40-50	5-15	---	NP
	10-26	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-2	0	70-90	65-85	50-60	25-35	---	NP
	26-63	Stratified gravelly coarse sand to fine sandy loam.	SM	A-1, A-2	0	90-100	75-85	45-55	15-30	---	NP
141---------------- Haybourne	0-10	Loamy sand--------	SP-SM, SM	A-1	0	90-100	75-95	40-50	5-15	---	NP
	10-26	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-2	0	70-90	65-85	50-60	25-35	---	NP
	26-60	Stratified gravelly coarse sand to fine sandy loam.	SM	A-1, A-2	0	90-100	75-85	45-55	15-30	---	NP
142---------------- Haybourne	0-12	Loamy sand--------	SP-SM, SM	A-1	0	90-100	75-95	40-50	5-15	---	NP
	12-28	Sandy loam, gravelly sandy loam, fine sandy loam.	SM	A-2	0	70-90	65-85	50-60	25-35	---	NP
	28-60	Stratified gravelly coarse sand to fine sandy loam.	SM	A-1, A-2	0	90-100	75-85	45-55	15-30	---	NP
150, 151---------- Doten Variant	0-5	Silty clay--------	CL, CH	A-7	0	100	100	95-100	90-95	40-60	20-30
	5-72	Silty clay, clay	CL, CH	A-7	0	100	100	90-100	75-100	40-60	20-30
160---------------- Incy	0-9	Sand--------------	SP-SM, SM	A-3, A-1, A-2	0	100	85-95	45-60	5-15	---	NP
	9-60	Fine sand, sand	SP-SM, SM	A-2, A-3	0	100	85-95	50-80	5-15	---	NP
161---------------- Incy	0-12	Fine sand---------	SP-SM, SM	A-2, A-3	0	100	80-100	65-90	5-15	---	NP
	12-60	Fine sand, sand	SP-SM, SM	A-2, A-3	0	100	85-95	50-80	5-15	---	NP
171---------------- Indian Creek	0-7	Gravelly sandy loam.	SM-SC	A-1, A-2	0-5	60-80	50-70	35-55	15-35	20-25	5-10
	7-18	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	18-25	Indurated---------	---	---	---	---	---	---	---	---	---
	25-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10
172, 173---------- Indian Creek	0-8	Sandy loam--------	SM-SC	A-2, A-4	0-5	90-100	80-90	55-65	25-40	20-25	5-10
	8-18	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	18-25	Indurated---------	---	---	---	---	---	---	---	---	---
	25-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
174---------------- Indian Creek	0-7	Extremely stony sandy loam.	SM	A-2, A-4	65-80	70-90	65-85	45-55	30-40	---	NP
	7-19	Clay, gravelly clay.	CH	A-7	0-25	80-100	70-100	65-90	55-80	55-70	30-45
	19-23	Indurated---------	---	---	---	---	---	---	---	---	---
	23-60	Cemented----------	---	---	---	---	---	---	---	---	---
175---------------- Indian Creek	0-7	Very cobbly loam	SC, SM-SC	A-2, A-6, A-4	40-55	70-90	60-85	55-75	30-50	25-35	5-15
	7-19	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	19-23	Indurated---------	---	---	---	---	---	---	---	---	---
	23-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10
176*:											
Indian Creek-----	0-7	Stony loam--------	SC, SM-SC	A-2, A-6, A-4	40-55	70-90	60-85	55-75	30-50	25-35	5-15
	7-19	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	80-100	60-90	55-80	50-80	55-70	30-45
	19-23	Indurated---------	---	---	---	---	---	---	---	---	---
	23-60	Stratified extremely gravelly loamy coarse sand to gravelly sandy clay loam.	GP-GM, GM-GC, GM	A-2, A-1	5-30	35-55	30-55	15-25	5-15	20-30	NP-10
Reno--------------	0-2	Very stony sandy loam.	SM	A-1, A-2, A-4	50-60	75-80	60-75	35-55	20-40	---	NP
	2-24	Sandy clay, clay, gravelly clay.	SC, CH, CL	A-7	0-20	80-100	75-95	65-95	35-85	40-60	25-35
	24-47	Cemented----------	---	---	---	---	---	---	---	---	---
	47	Weathered bedrock	---	---	---	---	---	---	---	---	---
Washoe------------	0-8	Extremely stony fine sandy loam.	SM	A-1, A-2	45-55	75-85	50-60	40-55	15-30	---	NP
	8-38	Very gravelly sandy clay loam, very gravelly sandy loam.	GC	A-2, A-6	5-20	55-70	45-55	40-50	20-40	25-35	10-15
	38-60	Stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	10-50	50-80	50-75	20-40	5-20	---	NP
190---------------- Manogue	0-2	Cobbly clay-------	CH, MH	A-7	15-20	70-85	65-75	60-75	50-70	55-65	25-35
	2-63	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	63-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
191---------------- Manogue	0-3	Cobbly clay-------	CH, MH	A-7	15-20	70-85	65-75	60-75	50-70	55-65	25-35
	3-63	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	63-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
192---------------- Manogue	0-4	Cobbly clay-------	CH, MH	A-7	15-20	70-85	65-75	60-75	50-70	55-65	25-35
	4-63	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	63-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
200---------------- Northmore	0-15	Sandy loam--------	SM	A-2	0-5	90-100	85-100	55-70	25-35	---	NP
	15-45	Sandy clay--------	SC, CL	A-7	0	95-100	90-100	70-95	35-60	40-50	25-30
	45-60	Sandy loam, sandy clay loam.	SM-SC	A-2, A-4	0	95-100	90-100	55-70	25-45	20-30	5-10

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
201---------------- Northmore	0-15	Sandy loam--------	SM	A-2	0-5	90-100	85-100	55-70	25-35	---	NP
	15-45	Sandy clay--------	SC, CL	A-7	0	95-100	90-100	70-95	35-60	40-50	25-30
	45-60	Sandy loam, sandy clay loam.	SM-SC	A-2, A-4	0	95-100	90-100	55-70	25-45	20-30	5-10
202, 203---------- Northmore	0-10	Sandy loam--------	SM	A-2	0-5	90-100	85-100	55-70	25-35	---	NP
	10-45	Sandy clay--------	SC, CL	A-7	0	95-100	90-100	70-95	35-60	40-50	25-30
	45-60	Sandy loam, sandy clay loam.	SM-SC	A-2, A-4	0	95-100	90-100	55-70	25-45	20-30	5-10
210, 211---------- Luppino	0-8	Gravelly sandy loam.	SM	A-1	0-5	75-90	55-65	35-45	15-25	---	NP
	8-14	Sandy clay loam, sandy loam, gravelly sandy clay loam.	SC	A-2, A-6	0	80-90	65-85	55-75	30-40	30-40	15-25
	14-23	Weathered bedrock	---	---	---	---	---	---	---	---	---
	23	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
221---------------- Oppio	0-3	Cobbly sandy loam	SM, SM-SC	A-1, A-2	20-30	70-75	60-70	40-50	20-30	15-25	NP-10
	3-21	Clay, sandy clay	CH	A-7	0-5	90-100	90-100	75-95	55-90	50-60	30-40
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
222---------------- Oppio	0-5	Cobbly sandy loam	SM, SM-SC	A-1, A-2	20-30	70-75	60-70	40-50	20-30	15-25	NP-10
	5-21	Clay, sandy clay	CH	A-7	0-5	90-100	90-100	75-95	55-90	50-60	30-40
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
223*: Oppio-------------	0-4	Cobbly sandy loam	SM, SM-SC	A-1, A-2	20-30	70-75	60-70	40-50	20-30	15-25	NP-10
	4-21	Clay, sandy clay	CH	A-7	0-5	90-100	90-100	75-95	55-90	50-60	30-40
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rezave------------	0-4	Extremely stony very fine sandy loam.	SM	A-4	35-45	90-100	85-95	60-80	35-50	20-25	NP-5
	4-13	Clay, clay loam, stony clay.	CL, CH	A-7	5-30	90-100	90-100	80-100	65-95	40-60	15-35
	13-19	Very gravelly clay, gravelly clay loam.	SC, CL	A-7	5-10	80-90	50-70	50-70	35-60	40-50	15-25
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
230---------------- Cradlebaugh	0-10	Loam--------------	CL	A-6	0	100	100	90-100	60-75	30-40	10-20
	10-35	Stratified silty clay loam to fine sandy loam.	CL	A-6	0	100	100	85-95	60-75	30-40	10-20
	35-60	Sandy loam--------	SM, SM-SC, ML, CL-ML	A-4	0	100	100	70-85	40-55	20-30	NP-10
240---------------- Updike	0-2	Loam--------------	ML	A-4	0	80-100	80-90	60-85	50-70	---	NP
	2-20	Clay, sandy clay	CH	A-7	0	95-100	95-100	90-100	60-95	50-60	30-40
	20-63	Stratified sandy clay loam to clay.	CL, CH	A-6, A-7	0	95-100	95-100	80-100	50-65	35-55	20-35

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
241--------------- Updike	0-2	Loam---------------	ML	A-4	0	80-100	80-90	60-85	50-70	---	NP
	2-36	Clay, sandy clay	CH	A-7	0	95-100	95-100	90-100	60-95	50-60	30-40
	36-47	Sandy clay loam, sandy clay, clay.	CL, CH	A-7	0	95-100	95-100	80-95	50-65	40-55	20-30
	47-63	Stratified gravelly sandy loam to extremely gravelly sand.	GM, GP-GM, SM, SP-SM	A-1	5-10	30-60	25-55	10-25	5-15	---	NP
250--------------- Cassiro	0-15	Gravelly sandy loam.	SM	A-1, A-2	0-5	65-80	55-70	30-50	15-30	---	NP
	15-45	Very gravelly sandy clay, very gravelly clay.	GC, SC	A-2	5-15	50-75	40-50	25-45	15-35	25-50	10-25
	45-60	Variable----------	---	---	---	---	---	---	---	---	---
251--------------- Cassiro	0-12	Gravelly sandy loam.	SM	A-1, A-2	0-5	65-80	55-70	30-50	15-30	---	NP
	12-40	Very gravelly sandy clay, very gravelly clay.	GC, SC	A-2	5-15	50-75	40-50	25-45	15-35	25-50	10-25
	40-60	Variable----------	---	---	---	---	---	---	---	---	---
252--------------- Cassiro	0-13	Gravelly sandy loam.	SM	A-1, A-2	0-5	65-80	55-70	30-50	15-30	---	NP
	13-40	Very gravelly sandy clay, very gravelly clay.	GC, SC	A-2	5-15	50-75	40-50	25-45	15-35	25-50	10-25
	40-60	Variable----------	---	---	---	---	---	---	---	---	---
260*:											
Acrelane---------	0-6	Very stony sandy loam.	SM	A-1, A-2	25-40	90-100	60-75	35-50	15-30	---	NP
	6-10	Very gravelly sandy clay loam, very gravelly coarse sandy loam.	SC, SM-SC	A-2	0-5	80-100	30-50	30-45	15-30	20-30	5-15
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
262--------------- Acrelane	0-4	Very stony sandy loam.	SM	A-1, A-2	25-40	90-100	60-75	35-50	15-30	---	NP
	4-10	Very gravelly sandy clay loam, very gravelly coarse sandy loam.	SC, SM-SC	A-2	0-5	80-100	30-50	30-45	15-30	20-30	5-15
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
280--------------- Wedekind	0-2	Gravelly loam-----	SM	A-2, A-4	0-5	75-85	50-65	40-60	30-50	15-25	NP-5
	2-14	Sandy clay loam, clay loam, gravelly sandy clay loam.	SC	A-2, A-6	0-5	80-90	55-90	45-70	20-50	30-40	10-20
	14-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
281--------------- Wedekind	0-2	Gravelly loam-----	SM	A-2, A-4	0-5	75-85	50-65	40-60	30-50	15-25	NP-5
	2-14	Sandy clay loam, clay loam, gravelly sandy clay loam.	SC	A-2, A-6	0-5	80-90	55-90	45-70	20-50	30-40	10-20
	14-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
282---------------- Wedekind	0-4	Gravelly sandy loam.	SM	A-1	0-5	75-85	50-65	30-45	15-25	---	NP
	4-14	Sandy clay loam, clay loam, gravelly sandy clay loam.	SC	A-2, A-6	0-5	80-90	55-90	45-70	20-50	30-40	10-20
	14-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
290---------------- Verdico Variant	0-5	Stony sandy loam	SM	A-1	5-10	75-95	55-65	35-45	15-25	---	NP
	5-28	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	85-95	65-85	60-70	50-65	50-60	30-40
	28	Weathered bedrock	---	---	---	---	---	---	---	---	---
291---------------- Verdico Variant	0-6	Very stony sandy loam.	SM	A-2	10-25	85-100	75-85	50-60	20-30	---	NP
	6-28	Gravelly clay, clay, sandy clay.	CH	A-7	0-5	85-95	65-85	60-70	50-65	50-60	30-40
	28	Weathered bedrock	---	---	---	---	---	---	---	---	---
300---------------- Surgem	0-4	Stony sandy loam	GM	A-1	5-10	45-60	40-55	25-40	15-25	15-25	NP-5
	4-24	Very cobbly clay, very cobbly sandy clay, very gravelly clay.	CL, CH, GC, SC	A-7, A-2	25-60	65-100	50-85	30-75	20-65	40-55	20-30
	24-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
301*: Surgem-----------	0-5	Stony sandy loam	GM	A-1	5-10	45-60	40-55	25-40	15-25	15-25	NP-5
	5-24	Very cobbly clay, very cobbly sandy clay, very gravelly clay.	CL, CH, GC, SC	A-7, A-2	25-60	65-100	50-85	30-75	20-65	40-55	20-30
	24-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
302*: Surgem-----------	0-6	Stony sandy loam	GM	A-1	5-10	45-60	40-55	25-40	15-25	15-25	NP-5
	6-24	Very cobbly clay, very cobbly sandy clay, very gravelly clay.	CL, CH, GC, SC	A-7, A-2	25-60	65-100	50-85	30-75	20-65	40-55	20-30
	24-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
310*: Risley-----------	0-4	Very stony loam	SC, CL	A-6	10-20	75-95	70-85	60-80	40-65	25-35	10-15
	4-24	Clay, clay loam, sandy clay.	CL	A-7	0-5	85-100	85-100	75-100	60-95	40-50	20-25
	24-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
311*: Risley-----------	0-3	Very stony loam	SC, CL	A-6	10-20	75-95	70-85	60-80	40-65	25-35	10-15
	3-23	Clay, clay loam, sandy clay.	CL	A-7	0-5	85-100	85-100	75-100	60-95	40-50	20-25
	23-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
312---------------- Risley	0-3	Cobbly loam-------	CL, CL-ML	A-6, A-4	25-40	80-100	75-90	65-80	50-65	25-35	5-15
	3-23	Clay, clay loam	CH, CL	A-7	0-5	85-100	85-100	75-100	60-95	40-55	20-30
	23-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
313----------------- Risley	0-4	Cobbly clay loam	CL	A-6	25-40	80-100	75-90	65-85	60-70	35-40	15-20
	4-40	Clay, clay loam	CH, CL	A-7	0-5	85-100	85-100	75-100	60-95	40-55	20-30
	40-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
314*:											
Risley------------	0-6	Cobbly loam-------	SC, CL	A-6	10-20	75-95	70-85	60-80	40-65	25-35	10-15
	6-28	Clay, clay loam, sandy clay.	CL	A-7	0-5	85-100	85-100	75-100	60-95	40-50	20-25
	28-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Xman--------------	0-3	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	3-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
341----------------- Yuko	0-2	Stony loam--------	CL	A-6	5-10	80-95	80-90	70-85	55-75	30-40	10-15
	2-8	Silty clay loam, clay loam.	CL	A-6, A-7	0-5	90-100	80-100	75-95	70-85	35-45	15-25
	8-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
342*:											
Yuko--------------	0-3	Very stony loam	CL, CL-ML	A-6, A-4	10-15	80-95	80-90	70-85	55-75	25-40	5-15
	3-9	Silty clay loam, clay loam.	CL	A-6, A-7	0-5	90-100	80-100	75-95	70-85	35-45	15-25
	9-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Reywat------------	0-6	Extremely stony loam.	GM, SM	A-4	25-55	55-80	50-70	45-65	35-50	25-35	NP-10
	6-14	Very gravelly clay loam, very gravelly loam.	GC	A-2, A-6	10-20	40-60	35-55	35-45	25-40	30-40	10-20
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
350----------------- Mizel	0-3	Very gravelly coarse sandy loam.	GM	A-1	5-10	40-60	30-40	15-30	10-25	---	NP
	3-7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
351*:											
Mizel-------------	0-3	Very gravelly coarse sandy loam.	GM	A-1	5-10	40-60	30-40	15-30	10-25	---	NP
	3-7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Skedaddle---------	0-5	Very stony loam	GC, SC	A-2, A-6	30-50	60-80	50-70	40-60	30-45	25-35	10-15
	5-8	Weathered bedrock	---	---	---	---	---	---	---	---	---
	8-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
360*. Pits											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
370---------------- Lemm	0-19	Very gravelly coarse sandy loam.	SM	A-1	0-5	75-95	35-50	25-35	10-20	---	NP
	19-40	Very gravelly coarse sandy loam, very gravelly sandy loam.	SM-SC, SC	A-2, A-1	0-5	70-90	35-50	20-30	15-25	20-35	5-15
	40-60	Very gravelly loamy coarse sand, gravelly loamy coarse sand.	SM, SP-SM	A-1	0-5	70-90	35-70	25-35	5-15	---	NP
390---------------- Duckhill	0-3	Stony loam--------	SM, GM	A-2, A-4	5-10	50-70	40-60	35-50	30-45	15-25	NP-5
	3-9	Very gravelly loam, very gravelly clay loam.	GC	A-6, A-2	10-20	40-70	35-60	30-50	25-50	30-40	10-20
	9-12	Weathered bedrock	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
391*:											
Duckhill---------	0-3	Stony loam--------	SM, GM	A-2, A-4	5-10	50-70	40-60	35-50	30-45	15-25	NP-5
	3-9	Very gravelly loam, very gravelly clay loam.	GC	A-6, A-2	10-20	40-70	35-60	30-50	25-50	30-40	10-20
	9-12	Weathered bedrock	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hirschdale-------	0-6	Very stony loam	CL, SC	A-6	25-35	80-90	70-80	45-65	40-55	25-35	10-15
	6-39	Gravelly clay loam, clay.	CL, CH	A-7	0-15	65-95	60-90	55-85	50-80	40-65	15-40
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
Fraval-----------	0-9	Very stony loam	CL-ML	A-4	45-55	80-95	80-90	65-85	50-70	20-30	5-10
	9-27	Very gravelly loam, very gravelly clay loam, very cobbly loam.	SC, GC	A-6	20-30	60-90	55-75	45-65	35-50	30-40	10-20
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
400, 401---------- Jubilee Variant	0-14	Loamy sand--------	SM	A-2	0	100	90-100	50-75	15-30	---	NP
	14-60	Stratified sandy loam to loamy coarse sand.	SM	A-2	0	100	90-100	50-70	15-35	---	NP
403---------------- Jubilee Variant	0-14	Loam---------------	SM, ML	A-4	0	100	90-100	60-95	45-65	---	NP
	14-60	Stratified sandy loam to loamy coarse sand.	SM	A-2	0	100	90-100	50-70	15-35	---	NP
410---------------- Ophir	0-11	Loamy sand--------	SM	A-2	0	95-100	80-100	50-75	15-30	---	NP
	11-60	Stratified gravelly coarse sand to sandy loam.	SM	A-1, A-2	0	85-100	60-90	35-55	10-25	---	NP
411---------------- Ophir	0-12	Loamy sand--------	SM	A-2	0	95-100	80-100	50-75	15-30	---	NP
	12-60	Stratified gravelly coarse sand to sandy loam.	SM	A-1, A-2	0	85-100	60-90	35-55	10-25	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
420--------------- Godecke	0-5	Loamy sand--------	SM	A-2	0	100	100	50-75	15-30	---	NP
	5-15	Clay loam, sandy clay loam.	CL	A-6, A-7	0	100	100	80-95	55-75	30-45	10-25
	15-60	Stratified sandy loam to clay.	ML, CL	A-6, A-7	0	100	100	90-95	65-75	35-45	10-20
423--------------- Godecke Variant	0-12	Loamy sand--------	SM	A-2	0	95-100	90-100	50-70	15-35	---	NP
	12-25	Sandy clay loam	SC, CL	A-6, A-7	0	95-100	95-100	80-95	35-60	35-45	15-25
	25-42	Sandy clay loam	SC	A-6, A-2	0	80-100	75-100	65-90	30-50	25-40	10-20
	42-60	Cemented----------	---	---	---	---	---	---	---	---	---
430, 431---------- Sagouspe Variant	0-5	Loamy very fine sand.	SM, ML	A-4	0	100	100	90-95	40-60	---	NP
	5-22	Sand--------------	SM, SP-SM	A-3, A-2	0	100	90-100	50-70	5-15	---	NP
	22-60	Stratified sand to silt loam.	SM	A-2, A-4	0	100	95-100	50-80	20-40	20-25	NP-5
440--------------- Jubilee	0-22	Sandy loam--------	SM	A-2	0	95-100	85-100	50-60	25-35	15-25	NP-5
	22-60	Stratified coarse sand to sandy loam.	SM	A-1	0	95-100	85-100	40-50	10-20	---	NP
441--------------- Jubilee	0-11	Clay loam---------	CL-ML, CL	A-4, A-6	0	100	100	85-95	60-75	25-35	5-15
	11-60	Stratified coarse sand to sandy loam.	SM	A-1	0	95-100	85-100	40-50	10-20	---	NP
442--------------- Jubilee	0-11	Gravelly sand-----	SP-SM, SM	A-1	0	90-100	70-85	35-50	5-20	---	NP
	11-28	Stratified coarse sandy loam to fine sandy loam.	SM	A-2	0	95-100	85-100	55-60	25-35	15-25	NP-5
	28-60	Stratified coarse sand to sandy loam.	SM	A-1	0	95-100	85-100	40-50	10-20	---	NP
443--------------- Jubilee	0-12	Loamy sand--------	SP-SM, SM	A-1	0	90-100	70-85	35-50	5-20	---	NP
	12-30	Stratified coarse sandy loam to fine sandy loam.	SM	A-2	0	95-100	85-100	55-60	25-35	15-25	NP-5
	30-60	Stratified coarse sand to sandy loam.	SM	A-1	0	95-100	85-100	40-50	10-20	---	NP
445--------------- Jubilee	0-22	Sandy loam--------	SM	A-2	0	95-100	85-100	50-65	25-35	---	NP
	22-60	Stratified fine sandy loam to loamy coarse sand.	SM	A-2, A-4	0	95-100	85-100	50-75	25-40	---	NP
450--------------- Voltaire	0-20	Loam--------------	CL	A-6	0	100	100	80-100	60-80	25-35	10-15
	20-60	Stratified silty clay loam to loamy sand.	CL	A-6	0	100	100	80-100	65-85	30-40	10-20
451--------------- Voltaire	0-15	Loam--------------	CL	A-6	0	100	100	85-100	70-85	30-40	10-20
	15-60	Stratified silty clay loam to loamy sand.	CL	A-6	0	100	100	90-100	75-90	35-40	15-20
452--------------- Voltaire	0-18	Loam--------------	CL	A-6	0	100	100	85-100	70-85	30-40	10-20
	18-60	Stratified silty clay loam to loamy sand.	CL	A-6	0	100	100	90-100	75-90	35-40	15-20
454--------------- Voltaire	0-20	Silty clay--------	CL, CH	A-7	0	100	100	95-100	90-95	45-55	20-30
	20-60	Stratified silty clay loam to loamy sand.	CL	A-6, A-7	0	100	100	85-95	75-85	30-45	10-20

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
455*:											
Voltaire	0-20	Silty clay	CL, CH	A-7	0	100	100	95-100	90-95	45-55	20-30
	20-60	Stratified silty clay loam to loamy sand.	CL	A-6, A-7	0	100	100	85-95	75-85	30-45	10-20
Truckee	0-12	Silt loam	ML	A-4	0	100	100	85-95	60-80	25-35	NP-10
	12-60	Stratified sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-35	5-15
456 Voltaire	0-9	Clay loam	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-20
	9-36	Stratified clay to silt loam.	CL	A-6, A-7	0	100	100	90-100	70-90	35-45	15-20
	36-60	Stratified very gravelly coarse sand to sandy clay loam.	GM	A-1, A-2	5-15	50-60	40-50	25-40	15-30	15-25	NP-5
460 Surprise	0-14	Loamy sand	SM	A-1, A-2	0	80-100	75-90	40-50	15-30	---	NP
	14-37	Stratified gravelly sandy loam to gravelly loam.	SM	A-1, A-2	0-5	60-80	50-75	30-50	15-35	20-30	NP-5
	37-66	Stratified gravelly loamy sand to sandy loam.	SM, GM	A-1, A-2	0-10	60-85	55-80	30-50	15-35	---	NP
461 Surprise	0-7	Coarse sandy loam	SM	A-1, A-2	0	80-100	75-90	40-55	20-30	---	NP
	7-24	Stratified gravelly sandy loam to gravelly loam.	SM	A-1, A-2	0-5	60-80	50-75	30-50	15-35	20-30	NP-5
	24-66	Stratified gravelly loamy sand to sandy loam.	SM, GM	A-1, A-2	0-10	60-85	55-80	30-50	15-35	---	NP
470 Dalzell	0-14	Loamy fine sand	SM	A-2	0	95-100	95-100	70-80	20-35	---	NP
	14-32	Sandy clay loam, loam, silty clay loam.	SC, CL	A-6, A-7	0	100	100	80-100	45-85	30-45	10-25
	32-36	Cemented	---	---	---	---	---	---	---	---	---
	36-60	Sandy loam, loamy sand, gravelly coarse sand.	SM, SP-SM	A-2, A-3, A-1	0	100	70-100	30-70	5-35	---	NP
480 Holbrook	0-14	Gravelly loamy sand.	SM	A-1	0-10	80-90	65-80	35-50	10-20	---	NP
	14-60	Stratified stony sand to very gravelly loam.	GM, SM	A-1, A-2	5-15	50-70	50-60	40-55	10-20	---	NP
482 Holbrook	0-10	Cobbly loamy sand	SM	A-1	20-30	75-90	45-65	25-40	10-20	---	NP
	10-60	Stratified stony sand to very gravelly loam.	GM, SM	A-1, A-2	5-15	50-70	50-60	40-55	10-20	---	NP
490 Graufels	0-10	Bouldery sand	SP-SM, SM	A-1, A-2, A-3	5-10	85-95	75-85	40-60	5-15	---	NP
	10-22	Gravelly loamy coarse sand, sand, gravelly loamy sand.	SM	A-1, A-2	0	85-90	60-80	30-55	10-20	---	NP
	22-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
491*:											
Graufels	0-10	Bouldery sand	SP-SM, SM	A-1, A-2, A-3	5-10	85-95	75-85	40-60	5-15	---	NP
	10-22	Gravelly loamy coarse sand, sand, gravelly loamy sand.	SM	A-1, A-2	0	85-90	60-80	30-55	10-20	---	NP
	22-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
492 Graufels	0-12	Bouldery sand	SP-SM, SM	A-1, A-2, A-3	5-10	85-95	75-85	40-60	5-15	---	NP
	12-26	Gravelly loamy coarse sand, sand, gravelly loamy sand.	SM	A-1, A-2	0	85-90	60-80	30-55	10-20	---	NP
	26-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
493*:											
Graufels	0-11	Gravelly loamy coarse sand.	SM	A-1, A-2	0	85-95	60-75	30-55	10-20	---	NP
	11-25	Gravelly loamy coarse sand, sand, gravelly loamy sand.	SM	A-1, A-2	0	85-90	60-80	30-55	10-20	---	NP
	25-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Glenbrook	0-7	Cobbly sand	SP-SM	A-1	15-30	80-95	60-75	30-50	5-10	---	NP
	7-13	Gravelly loamy coarse sand, gravelly sand, coarse sand.	SM, SP-SM	A-1	0-10	80-95	60-80	40-50	5-20	---	NP
	13	Weathered bedrock	---	---	---	---	---	---	---	---	---
494 Graufels	0-9	Gravelly loamy coarse sand.	SM	A-1, A-2	0	85-95	60-75	30-55	10-20	---	NP
	9-24	Gravelly loamy coarse sand, sand, gravelly loamy sand.	SM	A-1, A-2	0	85-90	60-80	30-55	10-20	---	NP
	24-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
495*:											
Graufels	0-9	Gravelly loamy coarse sand.	SM	A-1, A-2	0	85-95	60-75	30-55	10-20	---	NP
	9-23	Gravelly loamy coarse sand, sand, gravelly loamy sand.	SM	A-1, A-2	0	85-90	60-80	30-55	10-20	---	NP
	23-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Glenbrook	0-7	Cobbly sand	SP-SM	A-1	15-30	80-95	60-75	30-50	5-10	---	NP
	7-13	Gravelly loamy coarse sand, gravelly sand, coarse sand.	SM, SP-SM	A-1	0-10	80-95	60-80	40-50	5-20	---	NP
	13	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
496*:											
Graufels	0-15	Gravelly loamy coarse sand.	SM	A-1, A-2	0	85-95	60-75	30-55	10-20	---	NP
	15-26	Gravelly loamy coarse sand, sand, gravelly loamy sand.	SM	A-1, A-2	0	85-90	60-80	30-55	10-20	---	NP
	26-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
496*:											
Glenbrook	0-12	Cobbly sand	SP-SM	A-1	15-30	80-95	60-75	30-50	5-10	---	NP
	12-18	Gravelly loamy coarse sand, gravelly sand, coarse sand.	SM, SP-SM	A-1	0-10	80-95	60-80	40-50	5-20	---	NP
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Haypress	0-15	Very bouldery loamy coarse sand.	SM	A-1	10-35	80-95	65-80	35-50	10-25	---	NP
	15-46	Gravelly coarse sand, gravelly loamy coarse sand.	SP-SM, SM	A-1	5-10	60-85	50-75	25-50	5-15	---	NP
	46	Weathered bedrock	---	---	---	---	---	---	---	---	---
500, 504 Mottsville	0-10	Sand	SP-SM, SM	A-1, A-2, A-3	0	95-100	80-100	40-70	5-20	---	NP
	10-60	Stratified gravelly coarse sand to loamy sand.	SP-SM, SM	A-1	0	90-100	55-95	30-50	5-20	---	NP
505 Mottsville	0-11	Gravelly coarse sand.	SP-SM, SM	A-1	0	80-100	55-75	20-35	5-15	---	NP
	11-60	Stratified gravelly coarse sand to loamy sand.	SP-SM, SM	A-1	0	90-100	55-95	30-50	5-20	---	NP
510 Settlemeyer	0-15	Fine sandy loam	SM-SC	A-4	0	100	100	70-90	35-50	20-30	5-10
	15-39	Silty clay loam, clay loam.	CL	A-6	0	100	100	80-100	75-95	35-40	15-20
	39-60	Stratified very gravelly loamy sand to silty clay loam.	GC, CL, GM-GC, CL-ML	A-4, A-6	0-5	60-90	60-85	45-80	35-60	15-25	5-15
513*:											
Settlemeyer	0-15	Fine sandy loam	SM-SC	A-4	0	100	100	70-90	35-50	20-30	5-10
	15-39	Silty clay loam, clay loam.	CL	A-6	0	100	100	80-100	75-95	35-40	15-20
	39-60	Stratified very gravelly loamy sand to silty clay loam.	GC, CL, GM-GC, CL-ML	A-4, A-6	0-5	60-90	60-85	45-80	35-60	15-25	5-15
Notus	0-12	Stony loamy fine sand.	SM	A-2	5-10	80-100	70-100	55-80	15-35	---	NP
	12-60	Stratified very gravelly coarse sand to sandy loam.	GP-GM, GM, SP-SM, SM	A-1	15-25	40-70	35-50	15-35	5-15	---	NP
514 Settlemeyer	0-12	Gravelly loam	GC, CL, SC	A-6	0-5	70-90	60-75	50-75	45-60	20-30	10-15
	12-35	Silty clay loam, clay loam.	CL	A-6	0	100	100	80-100	75-95	35-40	15-20
	35-60	Stratified very gravelly loamy sand to silty clay loam.	GC, CL, GM-GC, CL-ML	A-4, A-6	0-5	60-90	60-85	45-80	35-60	15-25	5-15
520 Dressler	0-19	Loamy sand	SM	A-1, A-2	0-5	80-90	80-90	40-55	10-20	---	NP
	19-60	Stratified gravelly loamy sand to gravelly fine sandy loam.	SM, SP-SM	A-1	10-15	75-90	60-75	35-45	5-15	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
530----------------- Sagouspe	0-21	Sand-------------	SP-SM, SM	A-2, A-3	0	100	100	50-70	5-15	---	NP
	21-60	Stratified coarse sand to silt loam.	SM	A-2, A-4	0	100	100	50-75	15-40	10-20	NP-5
531----------------- Sagouspe	0-21	Fine sandy loam	SM, ML	A-4	0	100	100	70-85	40-55	10-20	NP-5
	21-60	Stratified coarse sand to silt loam.	SM	A-2, A-4	0	100	100	50-75	15-40	10-20	NP-5
532----------------- Sagouspe	0-10	Gravelly sand----	SP-SM	A-1, A-2, A-3	0-5	80-90	70-75	35-55	5-10	---	NP
	10-40	Stratified coarse sand to silt loam.	SM	A-2, A-4	0	100	100	50-75	15-40	10-20	NP-5
	40-60	Very gravelly loamy coarse sand.	GP-GM, GM	A-1	5-15	40-60	35-50	10-30	5-20	---	NP
550, 551, 553---- Leviathan	0-9	Stony sandy loam	SM, SM-SC	A-1, A-2	5-15	80-90	50-60	35-50	15-30	20-30	NP-10
	9-60	Very gravelly sandy clay loam.	GC, SC	A-2	10-30	50-70	40-50	35-45	15-25	35-45	15-20
554, 557---------- Leviathan	0-11	Very stony sandy loam.	GM, SM, GM-GC, SM-SC	A-1, A-2	5-20	60-90	50-60	35-50	15-30	20-30	NP-10
	11-60	Very gravelly sandy clay loam.	GC, SC	A-2	10-30	50-70	40-50	35-45	15-25	35-45	15-25
559----------------- Leviathan	0-11	Extremely stony sandy loam.	GM, SM, GM-GC, SM-SC	A-1, A-2	20-45	60-90	50-60	35-50	15-30	20-30	NP-10
	11-60	Very gravelly sandy clay loam.	GC, SC	A-2	10-30	50-70	40-50	35-45	15-25	35-45	15-25
570----------------- Turria	0-2	Loam-------------	CL-ML, CL	A-4, A-6	0	100	100	85-95	65-75	25-35	5-15
	2-12	Clay loam, loam	CL	A-6, A-7	0	100	100	90-100	65-80	35-45	15-20
	12-60	Stratified sandy loam to silt loam.	CL-ML, CL	A-4, A-6	0	100	100	90-100	60-80	25-35	5-15
585*:											
Barnard-----------	0-15	Stony sandy loam	SM, SM-SC	A-2, A-4	10-25	85-95	80-90	50-80	25-50	15-30	NP-10
	15-26	Clay, silty clay	CH	A-7	0-10	85-95	80-90	70-90	60-85	50-60	30-40
	26	Indurated---------	---	---	---	---	---	---	---	---	---
Trosi--------------	0-12	Very stony sandy loam.	SM, GM	A-1, A-2, A-4	15-30	60-80	50-75	30-50	20-40	15-25	NP-5
	12-19	Very cobbly clay, very cobbly clay loam.	CL, CH, GC	A-7	30-60	70-85	65-80	60-75	45-65	40-60	15-30
	19-34	Indurated---------	---	---	---	---	---	---	---	---	---
	34-60	Variable----------	---	---	---	---	---	---	---	---	---
590, 591---------- Springmeyer	0-13	Stony loam--------	SC, CL, SM-SC, CL-ML	A-6, A-4	5-10	80-100	75-95	55-75	35-60	25-35	5-15
	13-40	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	40-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	0-10	70-85	55-70	35-50	25-35	30-40	10-15

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
595---------------- Springmeyer	0-13	Sandy clay loam	SC, CL	A-6	0-5	80-100	80-95	60-80	45-60	25-35	10-15
	13-40	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	40-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	0-5	70-85	55-70	30-45	20-30	25-35	10-15
600---------------- Idlewild	0-13	Clay loam---------	CL	A-6	0-5	95-100	90-100	85-95	55-80	25-40	10-20
	13-36	Silty clay, silty clay loam, clay.	CH, CL	A-7	0-10	90-100	85-100	75-95	70-90	45-60	20-30
	36-62	Stratified sandy clay loam to silty clay.	CL	A-7	0-10	90-100	85-100	75-95	50-80	40-50	15-25
601---------------- Idlewild	0-13	Sandy loam--------	SM	A-2, A-4	0-5	95-100	90-100	60-85	30-50	15-25	NP-5
	13-36	Silty clay, silty clay loam, clay.	CH, CL	A-7	0-10	90-100	85-100	75-95	70-90	45-60	20-30
	36-62	Stratified sandy clay loam to silty clay.	CL	A-7	0-10	90-100	85-100	75-95	50-80	40-50	15-25
602---------------- Idlewild	0-10	Gravelly sandy loam.	SM	A-1, A-2	0-10	65-85	60-75	35-55	15-30	15-25	NP-5
	10-36	Silty clay, silty clay loam, clay.	CH, CL	A-7	0-10	90-100	85-100	75-95	70-90	45-60	20-30
	36-60	Stratified sandy clay loam to silty clay.	CL	A-7	0-10	90-100	85-100	75-95	50-80	40-50	15-25
612---------------- Verdico	0-2	Very stony sandy loam.	SM	A-2	15-25	85-100	75-85	50-60	20-30	---	NP
	2-22	Clay---------------	CH	A-7	0-5	85-95	85-95	75-95	65-90	50-65	30-45
	22-29	Gravelly clay-----	CH	A-7	0-5	75-95	65-75	60-75	50-70	50-65	30-45
	29-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
613, 614---------- Verdico	0-2	Extremely stony sandy loam.	SM	A-2	25-45	85-100	75-85	50-60	20-30	---	NP
	2-22	Clay---------------	CH	A-7	0-5	85-95	85-95	75-95	65-90	50-65	30-45
	22-29	Gravelly clay-----	CH	A-7	0-5	75-95	65-75	60-75	50-70	50-65	30-45
	29-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
615---------------- Verdico	0-2	Sandy loam--------	SM	A-2, A-4	0-5	90-100	85-95	50-65	25-40	---	NP
	2-22	Clay---------------	CH	A-7	0-5	85-95	85-95	75-95	65-90	50-65	30-45
	22-29	Gravelly clay-----	CH	A-7	0-5	75-95	65-75	60-75	50-70	50-65	30-45
	29-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
620, 621---------- Orr	0-10	Stony sandy loam	SM	A-2, A-4	5-10	80-100	70-100	50-70	20-40	---	NP
	10-50	Gravelly sandy loam, gravelly sandy clay loam, loam.	SM-SC, SC	A-2, A-4, A-6	0-5	75-85	70-85	60-80	30-50	25-35	5-15
	50-60	Gravelly sandy loam, sandy clay loam.	SM, SM-SC	A-2, A-1	0-5	70-85	60-80	40-65	20-35	15-30	NP-10
622---------------- Orr	0-12	Stony sandy loam	SM	A-2, A-1	5-10	60-85	55-75	30-60	15-35	15-25	NP-5
	12-50	Gravelly sandy clay loam.	SM-SC, SC	A-2, A-4, A-6	0-5	65-85	65-75	50-65	20-45	25-35	5-15
	50-60	Stratified very gravelly sand to gravelly sandy loam.	GM, SM, GP-GM, SP-SM	A-1	10-20	50-80	40-50	25-35	5-15	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
623----------------- Orr	0-10	Sandy loam--------	SM	A-2, A-4	0-5	85-95	80-90	60-70	30-40	---	NP
	10-50	Gravelly sandy loam, gravelly sandy clay loam, loam.	SM-SC, SC	A-2, A-4, A-6	0-5	75-85	70-85	60-80	30-50	25-35	5-15
	50-60	Gravelly sandy loam, sandy clay loam.	SM, SM-SC	A-2, A-1	0-5	70-85	60-80	40-65	20-35	15-30	NP-10
624----------------- Orr	0-12	Gravelly sandy loam.	SM	A-2, A-1	0-5	70-80	65-75	40-65	20-35	---	NP
	12-50	Gravelly sandy loam, gravelly sandy clay loam, loam.	SM-SC, SC	A-2, A-4, A-6	0-5	75-85	70-85	60-80	30-50	25-35	5-15
	50-60	Gravelly sandy loam, sandy clay loam.	SM, SM-SC	A-2, A-1	0-5	70-85	60-80	40-65	20-35	15-30	NP-10
630, 631---------- Fleischmann	0-4	Gravelly clay loam.	CL	A-6, A-7	0-5	75-85	65-75	60-70	50-65	30-45	15-25
	4-20	Clay--------------	CH	A-7	0-5	80-100	80-100	75-95	70-95	50-65	35-45
	20-43	Cemented----------	---	---	---	---	---	---	---	---	---
	43-60	Variable----------	---	---	---	---	---	---	---	---	---
632----------------- Fleischmann	0-4	Loam--------------	CL, SC	A-6	0-5	85-100	85-100	70-85	40-65	25-40	10-20
	4-20	Clay--------------	CH	A-7	0-5	80-100	80-100	75-95	70-95	50-65	35-45
	20-43	Cemented----------	---	---	---	---	---	---	---	---	---
	43-60	Variable----------	---	---	---	---	---	---	---	---	---
640----------------- Notus	0-12	Stony loamy fine sand.	SM	A-2	5-10	80-100	70-100	55-80	15-35	---	NP
	12-60	Stratified extremely gravelly coarse sand to sandy loam.	GP-GM, GM, SP-SM, SM	A-1	15-25	40-70	35-50	15-35	5-15	---	NP
650----------------- Chalco	0-3	Very stony clay loam.	CL	A-6	25-50	90-100	80-100	60-80	50-70	35-40	15-20
	3-15	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
651----------------- Chalco	0-4	Very stony clay loam.	CL	A-6	25-50	90-100	80-100	60-80	50-70	35-40	15-20
	4-15	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
652----------------- Chalco	0-3	Stony loam--------	SM, ML	A-2, A-4	25-40	70-90	65-80	45-65	30-60	25-35	NP-10
	3-15	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-60	30-40
	15-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
653----------------- Chalco	0-3	Cobbly sandy loam	SM	A-2	25-45	70-90	65-80	50-60	20-30	20-30	NP-5
	3-15	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-60	30-40
	15-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
654*:											
Chalco------------	0-3	Cobbly sandy loam	SM	A-2	25-45	70-90	65-80	50-60	20-30	20-30	NP-5
	3-15	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-60	30-40
	15-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
Celeton Variant-	0-6	Very gravelly loam.	GC	A-2, A-6	0-10	50-65	40-50	35-50	25-40	25-35	10-15
	6	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
660	0-13	Very bouldery sandy loam.	SM	A-1, A-2	15-25	70-90	60-75	35-55	20-30	15-25	NP
Oest	13-44	Very gravelly sandy loam, very gravelly sandy clay loam, very cobbly sandy loam.	SC	A-2	25-40	65-80	40-55	20-35	10-25	25-35	10-25
	44-60	Very gravelly loamy sand, extremely gravelly sand.	SC, SM-SC	A-1	20-30	40-50	30-40	15-25	5-10	---	5-15
661	0-14	Bouldery sandy loam.	SM, SM-SC	A-1, A-2	5-15	70-90	60-75	35-55	20-30	15-25	NP-10
Oest	14-40	Very gravelly sandy loam, very gravelly sandy clay loam, very cobbly sandy loam.	SC	A-2	25-40	65-80	40-55	20-35	10-25	25-35	10-25
	40-60	Very gravelly loamy sand, extremely gravelly sand.	SC, SM-SC	A-1	20-30	40-50	30-40	15-25	5-10	---	5-15
662	0-8	Extremely stony sandy loam.	SM, SM-SC	A-1, A-2	15-35	70-90	50-65	30-45	15-25	15-25	NP-10
Oest	8-40	Very gravelly sandy loam, very gravelly sandy clay loam, very cobbly sandy loam.	SC	A-2	25-40	65-80	40-55	20-35	10-25	25-35	10-25
	40-60	Very gravelly loamy sand, extremely gravelly sand.	SC, SM-SC	A-1	20-30	40-50	30-40	15-25	5-10	---	5-15
663	0-15	Very gravelly loam.	GM-GC	A-2	5-15	35-50	30-45	25-40	20-35	25-30	5-10
Oest	15-40	Very gravelly sandy loam, very gravelly sandy clay loam.	GC	A-2	15-25	45-60	35-50	20-35	10-25	25-35	10-15
	40-60	Very gravelly loamy sand, extremely gravelly loamy sand, extremely gravelly sand.	GP-GM	A-1	20-30	40-50	30-40	15-25	5-10	---	NP
664	0-14	Very gravelly loam.	GM-GC	A-2	5-15	35-50	30-45	25-40	20-35	25-30	5-10
Oest	14-40	Very gravelly sandy loam, very gravelly sandy clay loam.	GC	A-2	15-25	45-60	35-50	20-35	10-25	25-35	10-15
	40-60	Very gravelly loamy sand, extremely gravelly loamy sand, extremely gravelly sand.	GP-GM	A-1	20-30	40-50	30-40	15-25	5-10	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
668---------------- Oest	0-15	Very bouldery sandy loam.	SM, SM-SC	A-1, A-2	15-25	70-90	60-75	35-55	20-30	15-25	NP-10
	15-40	Very gravelly sandy loam, very gravelly sandy clay loam, very cobbly sandy loam.	SC	A-2	25-40	65-80	40-55	20-35	10-25	25-35	10-25
	40-60	Very gravelly loamy sand, extremely gravelly sand.	SC, SM-SC	A-1	20-30	40-50	30-40	15-25	5-10	---	5-15
669---------------- Oest	0-14	Gravelly sandy loam.	SM, SM-SC	A-1, A-2	5-10	70-90	60-75	35-55	20-30	15-25	NP-10
	14-40	Very gravelly sandy loam, very gravelly sandy clay loam.	GC	A-2	15-25	45-60	35-50	20-35	10-25	25-35	10-15
	40-60	Very gravelly loamy sand, extremely gravelly loamy sand, extremely gravelly sand.	GP-GM	A-1	20-30	40-50	30-40	15-25	5-10	---	NP
670---------------- Galeppi	0-10	Sandy loam--------	SM	A-2, A-4	0-10	95-100	90-100	55-70	30-40	15-25	NP-5
	10-22	Sandy clay loam, clay loam.	SC, CL	A-6	0-10	95-100	90-100	75-90	35-60	30-40	10-15
	22-60	Sandy loam--------	SM	A-2	0-10	95-100	90-100	55-70	20-35	15-25	NP-5
671---------------- Galeppi	0-10	Sandy loam--------	SM	A-2, A-4	0-10	95-100	90-100	55-70	30-40	15-25	NP-5
	10-24	Sandy clay loam, clay loam.	SC, CL	A-6	0-10	95-100	90-100	75-90	35-60	30-40	10-15
	24-60	Sandy loam--------	SM	A-2	0-10	95-100	90-100	55-70	20-35	15-25	NP-5
673---------------- Galeppi	0-10	Sandy loam--------	SM	A-2, A-4	0-10	95-100	90-100	55-70	30-40	15-25	NP-5
	10-21	Sandy clay loam, clay loam.	SC, CL	A-6	0-10	95-100	90-100	75-90	35-60	30-40	10-15
	21-60	Sandy loam--------	SM	A-2	0-10	95-100	90-100	55-70	20-35	15-25	NP-5
674---------------- Galeppi	0-10	Stony sandy loam	SM	A-2, A-4	20-40	85-95	80-95	50-70	30-40	15-25	NP-5
	10-21	Cobbly sandy clay loam, cobbly clay loam.	SC, CL	A-6	20-40	85-95	80-95	75-90	35-60	30-40	10-15
	21-60	Cobbly sandy loam	SM	A-2	20-40	85-95	80-95	50-70	20-35	15-25	NP-5
676*:											
Galeppi----------	0-9		SM	A-2, A-4	0-10	95-100	90-100	55-70	30-40	15-25	NP-5
	9-36	Sandy clay loam, clay loam.	SC, CL	A-6	0-10	95-100	90-100	75-90	35-60	30-40	10-15
	36-60	Sandy loam--------	SM	A-2	0-10	95-100	90-100	55-70	20-35	15-25	NP-5
Barnard----------	0-15	Stony sandy loam	SM, SM-SC	A-2, A-4	10-25	85-95	80-90	50-80	25-50	15-30	NP-10
	15-26	Clay, silty clay	CH	A-7	0-10	85-95	80-90	70-90	60-85	50-60	30-40
	26	Indurated---------	---	---	---	---	---	---	---	---	---
681---------------- Reno	0-2	Very stony fine sandy loam.	SM	A-1, A-2, A-4	50-60	75-80	60-75	35-55	20-40	---	NP
	2-24	Sandy clay, clay, gravelly clay.	SC, CH, CL	A-7	0-20	80-100	75-95	65-95	35-85	40-60	25-35
	24-47	Cemented----------	---	---	---	---	---	---	---	---	---
	47	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
683---------------- Reno	0-4	Stony sandy loam	SM	A-1, A-2	25-35	75-85	50-75	30-50	15-30	---	NP
	4-24	Sandy clay, clay, gravelly clay.	SC, CH, CL	A-7	0-20	80-100	75-95	65-95	35-85	40-60	25-35
	24-47	Cemented----------	---	---	---	---	---	---	---	---	---
	47	Weathered bedrock	---	---	---	---	---	---	---	---	---
730---------------- Stodick	0-4	Very stony loam	CL-ML	A-4	5-10	85-95	80-90	70-85	50-70	15-25	5-10
	4-14	Very gravelly clay loam, very gravelly loam.	GC, SC	A-2, A-6	0-5	50-75	35-55	30-55	20-45	30-40	10-20
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---
731---------------- Stodick	0-5	Stony loam--------	CL-ML	A-4	0-5	85-95	80-90	70-85	50-70	15-25	5-10
	5-14	Very gravelly clay loam, very gravelly loam.	GC, SC	A-2, A-6	0-5	50-75	35-55	30-55	20-45	30-40	10-20
	14	Weathered bedrock	---	---	---	---	---	---	---	---	---
740---------------- Blackwell	0-11	Sandy loam--------	SM	A-2	0	90-100	90-100	55-70	25-35	---	NP
	11-60	Stratified clay loam to gravelly coarse sand.	CL-ML, CL, SC, SM-SC	A-4, A-6	0	80-100	75-100	55-80	45-65	25-35	5-15
752*, 753*:											
Toiyabe----------	0-8	Bouldery coarse sand.	SP-SM, SM	A-1	5-20	70-100	60-85	20-50	5-20	---	NP
	8-13	Loamy coarse sand, gravelly loamy coarse sand, coarse sand.	SP-SM, SM	A-1	0-15	70-100	60-85	20-50	5-20	---	NP
	13	Weathered bedrock	---	---	---	---	---	---	---	---	---
Corbett----------	0-8	Bouldery sand-----	SP-SM, SM	A-1	10-25	65-90	55-80	30-50	5-15	---	NP
	8-32	Loamy coarse sand, loamy sand, gravelly loamy coarse sand.	SP-SM, SM	A-1	0-10	70-95	60-85	30-50	5-20	---	NP
	32	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
754*:											
Toiyabe----------	0-9	Bouldery coarse sand.	SP-SM, SM	A-1	5-20	70-100	60-85	20-50	5-20	---	NP
	9-13	Loamy coarse sand, gravelly loamy coarse sand, coarse sand.	SP-SM, SM	A-1	0-15	70-100	60-85	20-50	5-20	---	NP
	13	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
756*:											
Toiyabe----------	0-7	Bouldery coarse sand.	SP-SM, SM	A-1	5-20	70-100	60-85	20-50	5-20	---	NP
	7-15	Loamy coarse sand, gravelly loamy coarse sand, coarse sand.	SP-SM, SM	A-1	0-15	70-100	60-85	20-50	5-20	---	NP
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
756*:											
Corbett----------	0-9	Bouldery sand----	SP-SM, SM	A-1	10-25	65-90	55-80	30-50	5-15	---	NP
	9-34	Loamy coarse sand, loamy sand, gravelly loamy coarse sand.	SP-SM, SM	A-1	0-10	70-95	60-85	30-50	5-20	---	NP
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
Haypress---------	0-15	Very bouldery loamy coarse sand.	SM	A-1	10-35	80-95	65-80	35-50	10-25	---	NP
	15-46	Gravelly coarse sand, gravelly loamy coarse sand.	SP-SM, SM	A-1	5-10	60-85	50-75	25-50	5-15	---	NP
	46	Weathered bedrock	---	---	---	---	---	---	---	---	---
772--------------- Booford	0-7	Very stony sandy loam.	SM	A-4	25-40	60-100	80-100	70-80	35-50	---	NP
	7-25	Clay, silty clay, gravelly clay.	CH, GC	A-7	0-15	65-100	60-100	50-100	40-95	55-65	30-40
	25-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
775--------------- Booford	0-8	Very stony loam	ML, CL-ML	A-4	25-40	80-95	75-90	60-75	50-65	20-30	NP-10
	8-25	Clay, silty clay, gravelly clay.	CH, GC	A-7	0-15	65-100	60-100	50-100	40-95	55-65	30-40
	25-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
780--------------- Bieber	0-8	Stony sandy loam	SM, SM-SC	A-4	5-30	80-100	75-95	50-70	35-50	20-30	NP-10
	8-19	Clay, clay loam	CL, CH	A-7	0	80-100	75-95	70-90	60-85	45-60	20-35
	19-25	Indurated--------	---	---	---	---	---	---	---	---	---
	25-60	Variable									
782--------------- Bieber	0-7	Stony sandy loam	SM, SM-SC	A-4	5-30	80-100	75-95	50-70	35-50	20-30	NP-10
	7-19	Clay, clay loam	CL, CH	A-7	0	80-100	75-95	70-90	60-85	45-60	20-35
	19-25	Indurated--------	---	---	---	---	---	---	---	---	---
	25-60	Stratified cobbly sandy loam to very gravelly sandy loam.	GM	A-1	25-35	35-55	30-50	20-35	15-25	20-30	NP-5
800, 802---------- Truckee	0-12	Silt loam--------	ML	A-4	0	100	100	85-95	60-80	25-35	NP-10
	12-60	Stratified sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	25-35	5-15
805--------------- Truckee	0-12	Sandy loam-------	SM, ML	A-4	0	100	100	70-80	40-55	---	NP
	12-30	Stratified sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0-5	95-100	95-100	60-90	50-60	25-35	5-15
	30-60	Stratified gravelly sand to very gravelly sandy loam.	SP-SM, SM, GP-GM, GM	A-1	5-20	50-70	40-60	30-45	5-25	---	NP
806--------------- Truckee	0-12	Sandy loam-------	SM, ML	A-4	0	100	100	70-80	40-55	---	NP
	12-30	Stratified sandy loam to silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	85-95	60-75	20-35	5-15
	30-60	Stratified sand to very fine sandy loam.	SM	A-2	0	100	100	60-85	10-20	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
810---------------- Rose Creek	0-16	Fine sandy loam	SM, ML	A-4	0-5	90-100	80-95	65-80	45-55	25-30	NP-5
	16-60	Stratified gravelly sand to silt loam.	SM	A-2, A-4	0-5	85-100	70-95	50-70	30-40	20-25	NP-5
812---------------- Rose Creek	0-15	Loamy fine sand	SM	A-2	0-5	90-100	80-95	50-60	25-35	---	NP
	15-60	Stratified gravelly sand to silt loam.	SM	A-2, A-4	0-5	85-100	70-95	50-70	30-40	20-25	NP-5
813---------------- Rose Creek	0-16	Gravelly fine sandy loam.	SM	A-2, A-4	0-5	80-90	70-80	50-65	30-40	20-25	NP-5
	16-60	Stratified gravelly sand to silt loam.	SM	A-2, A-4	0-5	85-100	70-95	50-70	30-40	20-25	NP-5
820---------------- Marla	0-18	Loamy sand--------	SP-SM, SM	A-1	0	90-100	75-100	35-50	5-25	---	NP
	18-44	Loamy coarse sand, loamy sand.	SP-SM, SM	A-1	0	90-100	75-100	35-50	5-25	---	NP
	44-66	Stratified gravelly loamy coarse sand to sandy loam.	SM	A-1, A-2, A-4	0	90-100	50-90	40-75	15-40	20-30	NP-5
821---------------- Marla	0-18	Loamy sand--------	SP-SM, SM	A-1	0	90-100	75-100	35-50	5-25	---	NP
	18-44	Loamy coarse sand, loamy sand.	SP-SM, SM	A-1	0	90-100	75-100	35-50	5-25	---	NP
	44-66	Stratified gravelly loamy coarse sand to sandy loam.	SM	A-1, A-2, A-4	0	90-100	50-90	40-75	15-40	20-30	NP-5
830---------------- Fettic	0-1	Silty clay loam	CL	A-6	0	95-100	95-100	90-100	80-90	35-40	15-20
	1-21	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	95-100	80-90	35-45	15-20
	21-60	Stratified loamy sand to silty clay.	CL, SC	A-6	0	100	100	65-100	45-70	25-40	10-20
831---------------- Fettic	0-4	Loam---------------	CL	A-6	0	95-100	95-100	75-95	75-80	30-40	10-20
	4-20	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	95-100	80-90	35-45	15-20
	20-60	Stratified loamy sand to silty clay.	CL, SC	A-6	0	100	100	65-100	45-70	25-40	10-20
840*:											
Temo--------------	0-10	Bouldery coarse sand.	SP-SM	A-1	10-25	85-100	50-70	20-45	5-10	---	NP
	10-16	Gravelly loamy coarse sand, coarse sand, gravelly coarse sand.	SP-SM, SM	A-1	0-5	70-100	50-80	20-45	5-15	---	NP
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Witefels----------	0-8	Gravelly coarse sand.	SM, SP-SM	A-1	0-5	90-95	65-75	20-40	5-15	---	NP
	8-35	Gravelly loamy coarse sand, gravelly coarse sand.	SM	A-1	0-5	85-95	55-75	20-35	10-20	---	NP
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
840*: Rock outcrop.											
850------------ Washoe	0-8	Gravelly sandy loam.	SM	A-1	0-10	70-80	60-70	35-50	15-25	---	NP
	8-38	Very gravelly sandy clay loam, very gravelly sandy loam.	GC, SC	A-2, A-6	5-20	55-80	50-70	40-55	20-50	25-35	10-20
	38-60	Stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	10-50	50-70	40-60	20-40	5-20	---	NP
861------------ Reywat	0-6	Extremely stony loam.	GM, SM	A-4	25-55	55-80	50-70	45-65	35-50	25-35	NP-10
	6-18	Very gravelly clay loam, very gravelly loam.	GC	A-2, A-6	10-20	40-60	35-55	35-45	25-40	30-40	10-20
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
862------------ Reywat	0-6	Very cobbly sandy loam.	SM	A-2	25-55	80-85	75-80	45-55	25-30	20-25	NP-5
	6-18	Very gravelly clay loam, very gravelly loam.	GC	A-2, A-6	10-20	40-60	35-55	35-45	25-40	30-40	10-20
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
863*: Reywat----------	0-6	Extremely stony loam.	GM, SM	A-4	25-55	55-80	50-70	45-65	35-50	25-35	NP-10
	6-14	Very gravelly clay loam, very gravelly loam.	GC	A-2, A-6	10-20	40-60	35-55	35-45	25-40	30-40	10-20
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
870*: Xman------------	0-3	Extremely stony sandy loam.	SM	A-2	30-60	75-90	70-80	45-55	25-35	---	NP
	3-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
871------------ Xman	0-2	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
872------------ Xman	0-2	Very stony sandy loam.	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
873*:											
Xman------------	0-4	Extremely stony sandy loam.	SM	A-2	30-60	75-90	70-80	45-55	25-35	---	NP
	4-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
875*:											
Xman------------	0-2	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Zephan----------	0-8	Very stony sandy loam.	SM-SC	A-2	10-25	65-80	55-65	35-45	15-25	20-30	5-10
	8-35	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	35-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
Mizel-----------	0-3	Very gravelly coarse sandy loam.	GM	A-1	5-10	40-60	30-40	15-30	10-25	---	NP
	3-7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
876*:											
Xman------------	0-2	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Oppio-----------	0-6	Very stony fine sandy loam.	SM	A-1, A-2	25-35	65-75	45-65	35-50	20-30	10-20	NP-5
	6-27	Gravelly clay----	GC	A-6, A-7	0-5	60-70	50-60	45-55	40-50	35-45	20-30
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Old Camp--------	0-2	Extremely stony sandy loam.	SM	A-1	25-55	60-70	55-65	35-45	15-25	15-25	NP-5
	2-14	Very cobbly clay loam, very stony sandy clay loam, very stony loam.	GC, SC	A-2, A-6	35-50	65-70	55-65	45-55	30-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
877*:											
Xman------------	0-2	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
877*:											
Frodo	0-6	Very stony loam	CL, CL-ML	A-6, A-4	25-50	85-90	70-85	60-80	50-60	25-35	5-15
	6-18	Clay loam, clay, gravelly clay loam.	CL, CH	A-7	0-5	80-95	65-90	60-90	50-80	40-65	20-35
	18-23	Cemented	---	---	---	---	---	---	---	---	---
	23-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Mizel	0-3	Very gravelly coarse sandy loam.	GM	A-1	5-10	40-60	30-40	15-30	10-25	---	NP
	3-7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
880*:											
Zephan	0-8	Very gravelly sandy loam.	GM-GC, SM-SC	A-2	0-5	50-75	40-50	25-40	15-20	20-30	5-10
	8-35	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	35-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Smallcone	0-6	Very gravelly sandy loam.	GP-GM, GM, SP-SM, SM	A-1	0-10	40-75	15-50	10-30	5-25	20-30	NP-5
	6	Weathered bedrock	---	---	---	---	---	---	---	---	---
881 Zephan	0-8	Very gravelly sandy loam.	GM-GC, SM-SC	A-2	0-5	50-75	40-50	25-40	15-20	20-30	5-10
	8-35	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	35-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
882 Zephan	0-8	Stony sandy loam	SM-SC, SC	A-2	5-10	65-80	55-65	35-45	15-25	20-30	5-10
	8-35	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	35-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
890, 891 Indiano	0-14	Gravelly loam	GM, GM-GC, ML, CL-ML	A-4	0-5	60-80	60-75	50-70	35-60	20-30	NP-10
	14-29	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
892*:											
Indiano	0-13	Gravelly loam	GM, GM-GC, ML, CL-ML	A-4	0-5	60-80	60-75	50-70	35-60	20-30	NP-10
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
892*:											
Koontz----------	0-6	Cobbly loam------	SM, ML	A-4	15-30	80-90	70-80	45-60	40-55	20-30	NP-5
	6-18	Very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	0-15	50-65	35-50	25-45	25-40	30-40	10-20
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Flex------------	0-3	Very gravelly sandy loam.	GM, SM	A-1	0-10	40-65	40-50	30-40	15-25	15-25	NP-5
	3-10	Very gravelly sandy clay loam, very gravelly sandy loam.	GM-GC, GC	A-2	0-5	50-60	40-50	30-45	15-25	15-25	5-15
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
893*:											
Indiano---------	0-13	Stony fine sandy loam.	SM	A-1, A-2	20-25	70-85	65-80	40-65	20-35	---	NP
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Duco------------	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Cagle-----------	0-7	Very stony clay loam.	CL	A-6, A-7	25-35	85-95	80-90	75-85	55-65	35-45	15-25
	7-20	Gravelly clay----	CL, CH	A-7	0-5	65-75	65-70	60-70	50-60	45-55	20-30
	20-23	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	23	Weathered bedrock	---	---	---	---	---	---	---	---	---
894*:											
Indiano---------	0-13	Stony fine sandy loam.	SM	A-1, A-2	20-25	70-85	65-80	40-65	20-35	---	NP
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Duco------------	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
894*:											
Skedaddle	0-5	Very stony loam	GC, SC	A-2, A-6	30-50	60-80	50-70	40-60	30-45	25-35	10-15
	5-8	Weathered bedrock	---	---	---	---	---	---	---	---	---
	8-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
895*:											
Indiano	0-13	Stony fine sandy loam.	SM	A-1, A-2	20-25	70-85	65-80	40-65	20-35	---	NP
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Zephan	0-8	Very stony sandy loam.	SM-SC	A-2	10-25	65-80	55-65	35-45	15-25	20-30	5-10
	8-35	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	35-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
Duco	0-7	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	7-15	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
900 Flex	0-3	Very gravelly sandy loam.	GM, SM	A-1	0-10	40-65	40-50	30-40	15-25	15-25	NP-5
	3-10	Very gravelly sandy clay loam, very gravelly sandy loam.	GM-GC, GC	A-2	0-5	50-60	40-50	30-45	15-25	15-25	5-15
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
901 Flex	0-4	Very gravelly sandy loam.	GM, SM	A-1	0-10	40-65	40-50	30-40	15-25	15-25	NP-5
	4-10	Very gravelly sandy clay loam, very gravelly sandy loam.	GM-GC, GC	A-2	0-5	50-60	40-50	30-45	15-25	15-25	5-15
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
903 Flex	0-3	Stony sandy loam	SM	A-2	5-10	75-100	60-85	45-60	25-45	15-25	NP-5
	3-10	Very gravelly sandy clay loam, very gravelly sandy loam.	GM-GC, GC	A-2	0-5	50-60	40-50	30-45	15-25	15-25	5-15
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
910 Vamp	0-3	Fine sandy loam	SM, ML	A-4	0	100	90-100	65-80	40-60	---	NP
	3-36	Stratified silt loam to fine sandy loam.	SM, ML	A-4	0	90-100	90-100	70-90	45-65	20-30	NP-5
	36-42	Cemented	---	---	---	---	---	---	---	---	---
	42-60	Stratified silt loam to loamy sand.	SM, ML	A-4	0	90-100	85-100	60-80	35-60	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
911-------------- Vamp	0-3	Silt loam--------	ML	A-4	0	100	90-100	75-90	60-75	---	NP
	3-36	Stratified silt loam to fine sandy loam.	SM, ML	A-4	0	90-100	90-100	70-90	45-65	20-30	NP-5
	36-42	Cemented---------	---	---	---	---	---	---	---	---	---
	42-60	Stratified silt loam to loamy sand.	SM, ML	A-4	0	90-100	85-100	60-80	35-60	---	NP
930-------------- Old Camp	0-7	Stony sandy loam	SM	A-1	25-55	60-70	55-65	35-45	15-25	15-25	NP-5
	7-17	Very cobbly clay loam, very stony sandy clay loam, very stony loam.	GC, SC	A-2, A-6	35-50	65-70	55-65	45-55	30-40	30-40	15-25
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
931*:											
Old Camp-------- extremely stony	0-7	Extremely stony sandy loam.	SM	A-1	25-55	60-70	55-65	35-45	15-25	15-25	NP-5
	7-17	Very cobbly clay loam, very stony sandy clay loam, very stony loam.	GC, SC	A-2, A-6	35-50	65-70	55-65	45-55	30-40	30-40	15-25
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Old Camp-------- stony	0-8	Stony sandy loam	SM	A-1	25-55	60-70	55-65	35-45	15-25	15-25	NP-5
	8-17	Very cobbly clay loam, very stony sandy clay loam, very stony loam.	GC, SC	A-2, A-6	35-50	65-70	55-65	45-55	30-40	30-40	15-25
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
932-------------- Old Camp	0-7	Stony sandy loam	SM	A-1	25-55	60-70	55-65	35-45	15-25	15-25	NP-5
	7-17	Very cobbly clay loam, very stony sandy clay loam, very stony loam.	GC, SC	A-2, A-6	35-50	65-70	55-65	45-55	30-40	30-40	15-25
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
960, 961--------- Kayo	0-11	Stony sandy loam	GM	A-1	5-10	50-60	40-55	25-40	10-20	---	NP
	11-22	Very gravelly coarse sandy loam, very gravelly sandy loam.	GM-GC, GP-GC	A-1, A-2	5-10	45-60	30-50	10-35	5-20	20-25	5-10
	22-60	Very gravelly loamy coarse sand, very gravelly sandy loam, extremely gravelly sand.	GP-GM	A-1	5-10	30-55	25-45	10-30	5-10	---	NP
962-------------- Kayo	0-10	Very stony sandy loam.	GM, SM	A-1	10-25	50-70	45-60	25-40	15-25	---	NP
	10-25	Very gravelly coarse sandy loam, very gravelly sandy loam.	GM-GC, GP-GC	A-1, A-2	5-10	45-60	30-50	10-35	5-20	20-25	5-10
	25-60	Very gravelly loamy coarse sand, very gravelly sandy loam, extremely gravelly sand.	GP-GM	A-1	5-10	30-55	25-45	10-30	5-10	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
963---------------- Kayo	0-11	Very stony sandy loam.	GM, SM	A-1	10-25	50-70	45-60	25-40	15-25	---	NP
	11-22	Very gravelly coarse sandy loam, very gravelly sandy loam.	GM-GC, GP-GC	A-1, A-2	5-10	45-60	30-50	10-35	5-20	20-25	5-10
	22-60	Very gravelly loamy coarse sand, very gravelly sandy loam, extremely gravelly sand.	GP-GM	A-1	5-10	30-55	25-45	10-30	5-10	---	NP
971---------------- Aladshi	0-7	Sandy loam--------	SM	A-2	0-5	85-100	80-95	50-65	25-35	---	NP
	7-34	Gravelly loam, sandy clay loam, sandy loam.	SC, CL	A-6	5-10	80-95	70-90	55-75	45-60	25-35	10-20
	34-60	Stratified very gravelly loam to extremely gravelly loamy sand.	SM	A-1, A-2	5-10	60-75	35-50	25-40	15-30	---	NP
974---------------- Aladshi	0-6	Gravelly sandy loam.	SM	A-1, A-2	0-5	80-95	60-75	40-55	20-30	---	NP
	6-34	Gravelly loam, sandy clay loam, sandy loam.	SC, CL	A-6	5-10	80-95	70-90	55-75	45-60	25-35	10-20
	34-60	Stratified very gravelly loam to extremely gravelly loamy sand.	SM	A-1, A-2	5-10	60-75	35-50	25-40	15-30	---	NP
980---------------- Koontz	0-5	Gravelly loam-----	SM, ML	A-4	0-10	70-90	60-75	45-60	35-55	20-30	NP-5
	5-18	Very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	0-15	50-65	35-50	30-45	25-40	30-40	10-20
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
982---------------- Koontz	0-6	Stony loam--------	SM, ML	A-4	5-15	80-90	70-80	45-60	40-55	20-30	NP-5
	6-18	Very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	0-15	50-65	35-50	25-45	25-40	30-40	10-20
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
990*. Rock outcrop											
991*: Xeric Torriorthents.											
Urban land.											
992*. Playas											
993*. Haplaquolls											
994*: Badland.											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
994*:											
Chalco----------	0-3	Very stony clay loam.	CL	A-6	25-50	90-100	80-100	60-80	50-70	35-40	15-20
	3-15	Clay, silty clay	CH	A-7	0-5	80-100	75-100	70-90	65-85	50-65	25-35
	15	Weathered bedrock	---	---	---	---	---	---	---	---	---
Verdico---------	0-2	Extremely stony sandy loam.	SM	A-2	25-45	85-100	75-85	50-60	20-30	---	NP
	2-22	Clay-------------	CH	A-7	0-5	85-95	85-95	75-95	65-90	50-65	30-45
	22-29	Gravelly clay----	CH	A-7	0-5	75-95	65-75	60-75	50-70	50-65	30-45
	29-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
996*: Dune land.											
Playas.											
997*. Badland											
998*. Beaches											
1010------------- Gabica	0-14	Very gravelly sandy loam.	GM	A-1, A-2	5-10	40-55	25-50	20-45	15-35	15-25	NP-5
	14-19	Very gravelly clay loam, very gravelly silty clay loam, very stony clay loam.	GC	A-2, A-6	10-50	45-60	25-50	25-50	20-40	25-35	10-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1040------------- Orr Variant	0-18	Gravelly sandy loam.	SM	A-1, A-2	0-5	65-90	55-75	35-55	15-30	---	NP
	18-39	Sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	90-100	90-100	80-100	35-65	25-40	5-20
	39-65	Silty clay loam, silt loam.	ML, CL	A-4, A-6, A-7	0	95-100	95-100	90-100	70-95	30-45	5-20
1041------------- Orr Variant	0-10	Coarse sandy loam	SM	A-1, A-2, A-4	0-5	90-100	85-100	45-70	20-40	---	NP
	10-31	Sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-4, A-6	0	90-100	90-100	80-100	35-65	25-40	5-20
	31-60	Silty clay loam, silt loam.	ML, CL	A-4, A-6, A-7	0	95-100	95-100	90-100	70-95	30-45	5-20
1050------------- Waspo	0-7	Clay-------------	CH	A-7	0-5	90-100	85-100	75-95	65-90	50-60	25-35
	7-24	Clay-------------	CH	A-7	0-5	90-100	85-100	75-95	65-90	50-60	25-35
	24-35	Weathered bedrock	---	---	---	---	---	---	---	---	---
1051------------- Waspo	0-7	Stony clay-------	CH	A-7	5-10	90-100	85-100	75-95	65-90	50-60	25-35
	7-24	Clay-------------	CH	A-7	0-5	90-100	85-100	75-95	65-90	50-60	25-35
	24-35	Weathered bedrock	---	---	---	---	---	---	---	---	---
1052*:											
Waspo-----------	0-9	Stony clay-------	CH	A-7	5-10	90-100	85-100	75-95	65-90	50-60	25-35
	9-26	Clay-------------	CH	A-7	0-5	90-100	85-100	75-95	65-90	50-60	25-35
	26-35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1054------------- Waspo	0-6	Gravelly clay----	CH, SC	A-7	0-5	90-100	60-75	50-70	45-65	50-60	25-35
	6-23	Clay-------------	CH	A-7	0-5	90-100	85-100	75-95	65-90	50-60	25-35
	23-35	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1060*, 1062*:											
Witefels--------	0-8	Coarse sand------	SP-SM	A-1	0-5	95-100	85-95	20-40	5-10	---	NP
	8-35	Gravelly loamy coarse sand, gravelly coarse sand.	SM	A-1	0-5	85-95	55-75	20-35	10-20	---	NP
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1080------------- Inville Variant	0-8	Gravelly sandy loam.	SM	A-1, A-2	0-5	80-90	65-75	40-55	20-30	---	NP
	8-25	Very gravelly loam, very gravelly sandy loam, very gravelly sandy clay loam.	SC	A-2	5-10	75-85	40-50	30-45	10-25	25-35	10-15
	25-78	Gravelly sandy clay loam, gravelly clay loam, gravelly sandy loam.	SC	A-2, A-6	5-10	75-90	55-65	35-65	20-50	25-35	10-15
1090, 1091------- Railcity	0-6	Very bouldery coarse sand.	SP-SM, SM	A-1	15-25	90-100	60-80	25-40	5-15	---	NP
	6-60	Stratified extremely gravelly coarse sand to sandy loam.	SP-SM, SM	A-1	25-45	80-90	30-45	25-35	5-15	---	NP
1100*:											
Graylock--------	0-10	Bouldery loamy sand.	SM, SP-SM	A-1	5-10	80-90	35-55	20-30	5-15	---	NP
	10-60	Very gravelly coarse sand, very gravelly sand, very gravelly loamy sand.	SP, SP-SM	A-1	35-50	60-75	45-65	10-30	0-10	---	NP
	60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Temo------------	0-10	Bouldery coarse sand.	SP-SM	A-1	10-25	85-100	50-70	20-45	5-10	---	NP
	10-16	Gravelly loamy coarse sand, coarse sand, gravelly coarse sand.	SP-SM, SM	A-1	0-5	70-100	50-80	20-45	5-15	---	NP
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1120------------- Apmat	0-10	Very stony coarse sand.	SM, SP-SM	A-1	5-15	85-95	75-90	20-35	5-15	---	NP
	10-21	Very gravelly loamy sand.	SM, SP-SM, GM, GP-GM	A-1	0-15	50-60	40-50	20-30	5-15	---	NP
	21-55	Very stony coarse sandy loam, very stony sandy loam, extremely cobbly loam.	SM-SC	A-2	50-75	70-80	50-60	20-30	10-20	20-30	5-10
	55-60	Extremely bouldery loamy coarse sand.	SM, SP-SM	A-1	60-85	65-75	40-50	20-30	5-15	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1121----------- Apmat	0-10	Gravelly sandy loam.	GM, SM	A-2	0-10	60-80	50-75	35-60	25-35	---	NP
	10-21	Very gravelly loamy sand.	SM, SP-SM, GM, GP-GM	A-1	0-15	50-60	40-50	20-30	5-15	---	NP
	21-55	Very stony coarse sandy loam, very stony sandy loam, extremely cobbly loam.	SM-SC	A-2	50-75	70-80	50-60	20-30	10-20	20-30	5-10
	55-60	Extremely bouldery loamy coarse sand.	SM, SP-SM	A-1	60-85	65-75	40-50	20-30	5-15	---	NP
1130----------- Dithod	0-15	Sandy loam-------	SM	A-2, A-4	0-5	80-100	80-100	55-70	25-40	---	NP
	15-60	Stratified loamy fine sand to clay loam.	SM-SC, SC, CL-ML, CL	A-4, A-6	0-5	80-100	80-100	70-95	40-55	25-35	5-15
1141, 1142------- Bedell	0-15	Loamy sand-------	SM	A-1, A-2	0-5	95-100	80-95	40-65	15-30	---	NP
	15-54	Sandy loam-------	SM	A-2	0-5	95-100	80-95	30-65	25-35	---	NP
	54-65	Loamy coarse sand, sand, sandy loam.	SP-SM, SM	A-1, A-2, A-3	0-15	95-100	80-90	40-65	5-30	---	NP
1143----------- Bedell	0-14	Loamy sand-------	SM	A-1, A-2	0-5	95-100	80-95	40-65	15-30	---	NP
	14-50	Sandy loam-------	SM	A-2	0-5	95-100	80-95	30-65	25-35	---	NP
	50-60	Loamy coarse sand, sand, sandy loam.	SP-SM, SM	A-1, A-2, A-3	0-15	95-100	80-90	40-65	5-30	---	NP
1160----------- Jowec	0-2	Silty clay loam	CL	A-6	0	95-100	95-100	90-100	85-95	35-40	15-20
	2-20	Clay-------------	CH	A-7	0	95-100	95-100	85-100	75-90	50-55	25-30
	20-38	Clay loam--------	CL	A-7	0	95-100	95-100	80-95	65-80	40-50	20-25
	38-60	Stratified loam to sandy loam.	CL-ML, SM-SC	A-4	0	95-100	90-100	65-85	40-60	25-30	5-10
1161----------- Jowec	0-2	Sandy loam-------	SM	A-4	0	95-100	95-100	65-80	35-50	15-25	NP-5
	2-20	Clay-------------	CH	A-7	0	95-100	95-100	85-100	75-90	50-55	25-30
	20-38	Clay loam--------	CL	A-7	0	95-100	95-100	80-95	65-80	40-50	20-25
	38-60	Stratified loam to sandy loam.	CL-ML, SM-SC	A-4	0	95-100	90-100	65-85	40-60	25-30	5-10
1170----------- Wedertz	0-6	Sandy loam-------	SM-SC, SM	A-2	0-5	90-100	85-95	50-65	25-35	20-25	NP-5
	6-22	Sandy clay loam, clay loam.	SC, CL	A-2, A-6	0-5	90-100	90-100	70-90	30-55	30-40	10-20
	22-34	Sandy loam-------	SM-SC	A-2	0-5	90-100	90-100	55-70	25-35	25-30	5-10
	34-60	Gravelly loamy sand.	SM	A-1	0-5	65-85	55-70	30-50	10-20	---	NP
1171----------- Wedertz	0-8	Sandy loam-------	SM-SC, SM	A-2	0-5	90-100	85-95	50-65	25-35	20-25	NP-5
	8-31	Sandy clay loam, clay loam.	SC, CL	A-2, A-6	0-5	90-100	90-100	70-90	30-55	30-40	10-20
	31-38	Sandy loam-------	SM-SC	A-2	0-5	90-100	90-100	55-70	25-35	25-30	5-10
	38-60	Gravelly loamy sand.	SM	A-1	0-5	65-85	55-70	30-50	10-20	---	NP
1172----------- Wedertz	0-7	Sand-------------	SM, SP-SM	A-2, A-3	0-5	90-100	90-100	50-70	5-15	---	NP
	7-25	Sandy clay loam, clay loam.	SC, CL	A-2, A-6	0-5	90-100	90-100	70-90	30-55	30-40	10-20
	25-31	Sandy loam-------	SM-SC	A-2	0-5	90-100	90-100	55-70	25-35	25-30	5-10
	31-60	Gravelly loamy sand.	SM	A-1	0-5	65-85	55-70	30-50	10-20	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1181*:											
Haypress--------	0-15	Very bouldery loamy coarse sand.	SM	A-1	10-35	80-95	65-80	35-50	10-25	---	NP
	15-40	Gravelly coarse sand, gravelly loamy coarse sand.	SP-SM, SM	A-1	5-10	60-85	50-75	25-50	5-15	---	NP
	40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Tanob-----------	0-17	Gravelly loamy coarse sand.	SM	A-1	0-5	80-95	55-75	25-40	10-25	---	NP
	17-28	Sandy loam, coarse sandy loam.	SM	A-2, A-4	0-5	90-100	75-95	45-60	25-45	15-20	NP-5
	28	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1182*:											
Haypress--------	0-15	Extremely bouldery loamy coarse sand.	SM	A-1	25-70	80-95	65-80	35-50	10-25	---	NP
	15-40	Gravelly coarse sand, gravelly loamy coarse sand.	SP-SM, SM	A-1	5-10	60-85	50-75	25-50	5-15	---	NP
	40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Tanob-----------	0-17	Gravelly loamy coarse sand.	SM	A-1	0-5	80-95	55-75	25-40	10-25	---	NP
	17-28	Sandy loam, coarse sandy loam.	SM	A-2, A-4	0-5	90-100	75-95	45-60	25-45	15-20	NP-5
	28	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1183*:											
Haypress--------	0-14	Very bouldery loamy coarse sand.	SM	A-1	10-35	80-95	65-80	35-50	10-25	---	NP
	14-49	Gravelly coarse sand, gravelly loamy coarse sand.	SP-SM, SM	A-1	5-10	60-85	50-75	25-50	5-15	---	NP
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1190, 1191------- Spasprey	0-2	Sandy loam-------	SM, SP-SM	A-1, A-2, A-3	0-5	90-100	85-95	40-65	5-25	15-20	NP-5
	2-12	Sandy clay loam, clay loam, loam.	SC, CL	A-6	0-5	95-100	90-100	70-95	45-70	30-40	10-20
	12-29	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	95-100	90-100	45-70	15-35	---	NP
	29-46	Cemented---------	---	---	---	---	---	---	---	---	---
	46-60	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	95-100	90-100	45-70	15-35	---	NP
1192------------- Spasprey	0-6	Sand-------------	SM, SP-SM	A-1, A-2, A-3	0-5	90-100	85-95	40-65	5-25	15-20	NP-5
	6-14	Sandy clay loam, clay loam, loam.	SC, CL	A-6	0-5	95-100	90-100	70-95	45-70	30-40	10-20
	14-30	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	95-100	90-100	45-70	15-35	---	NP
	30-47	Cemented---------	---	---	---	---	---	---	---	---	---
	47-60	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	95-100	90-100	45-70	15-35	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1193-------------- Spasprey	0-2	Sandy loam-------	SM, SP-SM	A-1, A-2, A-3	0-5	90-100	85-95	40-65	5-25	15-20	NP-5
	2-12	Sandy clay loam, clay loam, loam.	SC, CL	A-6	0-5	95-100	90-100	70-95	45-70	30-40	10-20
	12-29	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	95-100	90-100	45-70	15-35	---	NP
	29-46	Cemented---------	---	---	---	---	---	---	---	---	---
	46-60	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	95-100	90-100	45-70	15-35	---	NP
1194-------------- Spasprey	0-3	Stony sandy loam	SM-SC, SM, ML, CL-ML	A-4	0-5	85-95	80-90	50-75	45-60	20-30	NP-10
	3-14	Sandy clay loam, clay loam, loam.	SC, CL	A-6	0-5	95-100	90-100	70-95	45-70	30-40	10-20
	14-23	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	95-100	90-100	45-70	15-35	---	NP
	23-40	Cemented---------	---	---	---	---	---	---	---	---	---
	40-60	Sandy loam, loamy sand.	SM	A-1, A-2	0-5	95-100	90-100	45-70	15-35	---	NP
1200-------------- Mellor	0-11	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	75-90	15-25	NP-10
	11-26	Silty clay loam, clay loam.	CL	A-6	0	100	100	90-100	80-95	25-40	10-20
	26-60	Silty clay loam, clay loam, silt loam.	CL	A-6	0	100	100	85-100	80-95	30-40	10-15
1210, 1211------- Linhart	0-14	Stony coarse sand	SP, SP-SM, SM	A-1	5-10	80-90	40-50	25-35	0-15	---	NP
	14-60	Stratified gravelly coarse sand to extremely gravelly loamy coarse sand.	SP, SP-SM, SM	A-1	0-5	75-90	20-50	10-35	0-15	---	NP
1220-------------- Calpine	0-19	Coarse sandy loam	SM	A-2	0-5	95-100	75-100	50-70	20-35	15-25	NP-5
	19-45	Sandy loam, coarse sandy loam.	SM	A-2, A-4	0-5	100	75-100	50-70	20-40	15-25	NP-5
	45-65	Stratified loamy fine sand to coarse sand.	SP-SM, SM	A-1, A-2	0-5	100	75-100	40-70	10-25	---	NP
1240-------------- Pizene	0-6	Sandy loam-------	SM	A-2, A-4	0	100	75-100	60-70	30-40	15-20	NP-5
	6-21	Sandy clay loam, sandy loam.	SC	A-6	0	100	100	70-85	35-50	30-40	10-20
	21-60	Sandy loam, fine sandy loam.	SM	A-4	0	75-100	100	70-85	35-50	15-20	NP-5
1250-------------- Rednik	0-6	Very gravelly sandy loam.	GM	A-1, A-2	0-5	45-55	35-50	25-40	15-30	---	NP
	6-20	Very gravelly sandy loam, extremely gravelly loam, very gravelly sandy clay loam.	GC	A-2	5-30	35-60	30-50	20-35	15-30	25-35	10-15
	20-65	Very gravelly sandy loam, very gravelly sand, extremely gravelly loamy sand.	GP-GM, GM	A-1	5-30	35-60	30-50	15-35	5-25	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1251------------- Rednik	0-6	Very stony sandy loam.	GM	A-1, A-2	30-35	45-65	40-60	30-45	15-35	---	NP
	6-20	Very gravelly sandy loam, extremely gravelly loam, very gravelly sandy clay loam.	GC	A-2	5-30	35-60	30-50	20-35	15-30	25-35	10-15
	20-65	Very gravelly sandy loam, very gravelly sand, extremely gravelly loamy sand.	GP-GM, GM	A-1	5-30	35-60	30-50	15-35	5-25	---	NP
1260*:											
Thulepah---------	0-6	Very stony loam	SM	A-4	10-20	80-90	65-75	60-70	40-50	15-25	NP-5
	6-28	Gravelly clay loam, clay loam.	CL, SC	A-6, A-7	5-15	75-85	60-80	50-65	45-55	35-45	15-20
	28-60	Clay loam, gravelly clay loam, silty clay loam.	CL	A-6, A-7	5-10	70-95	65-90	65-85	55-75	35-45	15-25
Mosquet----------	0-5	Very cobbly fine sandy loam.	SM-SC, SC, GM-GC, GC	A-2	25-35	60-70	55-65	40-50	25-35	20-30	5-15
	5-14	Cobbly sandy clay, gravelly clay.	GC, SC	A-7	5-20	65-75	60-70	55-65	35-50	40-50	25-35
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1270*:											
Tristan----------	0-7	Very stony loam	GM-GC	A-2, A-4	30-50	55-70	50-65	35-55	30-50	20-30	5-10
	7-28	Very stony loam, very cobbly clay loam, very gravelly clay loam.	GC, SC, CL	A-2, A-6	30-50	40-80	35-70	30-60	25-55	25-40	10-20
	28-49	Extremely cobbly loam, extremely cobbly sandy clay loam.	GC	A-2	55-75	40-50	35-45	15-40	10-35	25-35	10-15
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Indiano----------	0-13	Gravelly loam----	GM, GM-GC, ML, CL-ML	A-4	0-5	60-80	60-75	50-70	35-60	20-30	NP-10
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lemm-------------	0-19	Very stony sandy loam.	SM	A-2	15-25	75-95	50-75	40-60	25-35	---	NP
	19-40	Very gravelly coarse sandy loam, very gravelly sandy loam.	SM-SC, SC	A-2, A-1	0-5	70-90	35-50	20-30	15-25	20-35	5-15
	40-60	Very gravelly loamy coarse sand, gravelly loamy coarse sand.	SM, SP-SM	A-1	0-5	70-90	35-70	25-35	5-15	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1271*:											
Tristan	0-7	Very stony loam	GM-GC	A-2, A-4	30-50	55-70	50-65	35-55	30-50	20-30	5-10
	7-28	Very stony loam, very cobbly clay loam, very gravelly clay loam.	GC, SC, CL	A-2, A-6	30-50	40-80	35-70	30-60	25-55	25-40	10-20
	28-49	Extremely cobbly loam, extremely cobbly sandy clay loam.	GC	A-2	55-75	40-50	35-45	15-40	10-35	25-35	10-15
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Barshaad	0-1	Very stony loam	SM-SC, CL-ML	A-4	15-30	80-90	80-85	60-80	45-65	20-30	5-10
	1-24	Gravelly clay	CH	A-7	0-10	60-80	60-75	55-70	50-65	50-65	25-30
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Arzo	0-2	Very stony loam	CL, SC	A-6	20-30	80-85	60-70	50-70	35-60	30-35	10-15
	2-27	Clay loam, gravelly clay, clay.	CH, CL	A-7	0-10	90-95	75-90	65-90	50-80	40-55	20-30
	27-35	Gravelly loam	SC, SM-SC, GC, GM-GC	A-2, A-6, A-4	0-10	60-80	55-75	35-60	30-50	25-35	5-15
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
1272*:											
Tristan	0-7	Very stony loam	GM-GC	A-2, A-4	30-50	55-70	50-65	35-55	30-50	20-30	5-10
	7-28	Very stony loam, very cobbly clay loam, very gravelly clay loam.	GC, SC, CL	A-2, A-6	30-50	40-80	35-70	30-60	25-55	25-40	10-20
	28-49	Extremely cobbly loam, extremely cobbly sandy clay loam.	GC	A-2	55-75	40-50	35-45	15-40	10-35	25-35	10-15
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Arzo	0-2	Very stony loam	CL, SC	A-6	20-30	80-85	60-70	50-70	35-60	30-35	10-15
	2-27	Clay loam, gravelly clay, clay.	CH, CL	A-7	0-10	90-95	75-90	65-90	50-80	40-55	20-30
	27-35	Gravelly loam	SC, SM-SC, GC, GM-GC	A-2, A-6, A-4	0-10	60-80	55-75	35-60	30-50	25-35	5-15
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Reywat	0-6	Extremely stony loam.	GM, SM	A-4	25-55	55-80	50-70	45-65	35-50	25-35	NP-10
	6-18	Very gravelly clay loam, very gravelly loam.	GC	A-2, A-6	10-20	40-60	35-55	35-45	25-40	30-40	10-20
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1273*:											
Tristan	0-7	Very stony loam	GM-GC	A-2, A-4	30-50	55-70	50-65	35-55	30-50	20-30	5-10
	7-28	Very stony loam, very cobbly clay loam, very gravelly clay loam.	GC, SC, CL	A-2, A-6	30-50	40-80	35-70	30-60	25-55	25-40	10-20
	28-49	Extremely cobbly loam, extremely cobbly sandy clay loam.	GC	A-2	55-75	40-50	35-45	15-40	10-35	25-35	10-15
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1273*:											
Barshaad	0-1	Very stony loam	SM-SC, CL-ML	A-4	15-30	80-90	80-85	60-80	45-65	20-30	5-10
	1-24	Gravelly clay	CH	A-7	0-10	60-80	60-75	55-70	50-65	50-65	25-30
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
Frodo	0-6	Very stony loam	CL, CL-ML	A-6, A-4	25-50	85-90	70-85	60-80	50-60	25-35	5-15
	6-18	Clay loam, clay, gravelly clay loam.	CL, CH	A-7	0-5	80-95	65-90	60-90	50-80	40-65	20-35
	18-23	Cemented	---	---	---	---	---	---	---	---	---
	23-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1290 Parran	0-5	Silty clay loam	CL	A-7	0	100	100	95-100	85-95	40-45	15-20
	5-60	Silty clay, clay	CL, CH	A-7	0	100	100	95-100	75-95	45-60	20-30
1300 Rose Creek Variant	0-5	Sandy loam	SM, ML	A-4	0	80-100	80-100	55-75	40-60	20-25	NP-5
	5-12	Very fine sandy loam.	SM-SC, CL-ML	A-4	0	85-100	85-100	75-95	35-55	20-30	5-10
	12-60	Stratified gravelly loamy sand to loam.	SM-SC, CL-ML	A-4	0	70-100	70-100	60-90	40-60	20-30	5-10
1301 Rose Creek Variant	0-5	Loamy fine sand	SM	A-2, A-4	0	90-100	90-100	80-95	25-40	---	NP
	5-12	Very fine sandy loam.	SM-SC, CL-ML	A-4	0	85-100	85-100	75-95	35-55	20-30	5-10
	12-60	Stratified gravelly loamy sand to loam.	SM-SC, CL-ML	A-4	0	70-100	70-100	60-90	40-60	20-30	5-10
1310 Bango	0-2	Gravelly sandy loam.	SM	A-1, A-2	0-5	75-85	70-80	40-60	20-35	---	NP
	2-10	Loam, clay loam	CL	A-6	0-5	90-100	90-100	75-90	55-75	30-35	10-15
	10-60	Stratified gravelly fine sandy loam to silt loam.	CL	A-6	0-5	85-95	85-95	70-90	55-75	25-35	10-15
1320*:											
Osobb	0-2	Extremely stony fine sandy loam.	GP-GM, GM, GM-GC	A-1, A-2	50-70	35-55	30-50	20-40	5-25	20-30	NP-10
	2-11	Very cobbly very fine sandy loam, extremely cobbly fine sandy loam, very gravelly loam.	GP-GM, GM, GM-GC	A-1, A-2	45-55	25-60	20-50	15-35	5-20	20-30	NP-10
	11-13	Indurated	---	---	---	---	---	---	---	---	---
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rezave	0-4	Extremely stony very fine sandy loam.	SM	A-4	35-45	90-100	85-95	60-80	35-50	20-25	NP-5
	4-13	Clay, clay loam, stony clay.	CL, CH	A-7	5-30	90-100	90-100	80-100	65-95	40-60	15-35
	13-19	Very gravelly clay, gravelly clay loam.	SC, CL	A-7	5-10	80-90	50-70	50-70	35-60	40-50	15-25
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1320*:											
Fireball	0-3	Extremely stony fine sandy loam.	SM-SC	A-2, A-4	40-50	80-90	70-80	50-70	30-45	20-25	5-10
	3-24	Very cobbly loam, very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	25-40	60-70	50-60	40-60	30-50	25-40	10-20
	24-47	Extremely cobbly loam, very gravelly silt loam.	GM-GC	A-2, A-4	45-55	60-70	40-50	35-50	25-40	20-25	5-10
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1330*:											
Sutcliff	0-5	Very stony loam	GC, SC	A-2, A-6	40-50	60-70	40-60	35-55	25-50	25-35	10-15
	5-25	Very cobbly clay loam, very stony clay loam.	CL	A-6	40-50	85-95	75-85	60-85	50-70	35-40	15-20
	25-42	Very cobbly loam	SC	A-6	35-45	70-80	55-65	45-60	35-50	25-35	10-15
	42-53	Cemented	---	---	---	---	---	---	---	---	---
Kleinbush	0-5	Very cobbly loamy sand.	SM	A-2	50-60	85-95	80-90	50-70	10-25	---	NP
	5-38	Clay loam, clay	CL, CH	A-7	0	90-100	90-100	80-100	65-95	40-65	20-35
	38-60	Cobbly sandy clay loam, very gravelly sandy loam, cobbly sandy loam.	SC, SM-SC	A-2, A-4, A-6	10-15	90-100	55-80	35-65	15-40	25-40	5-15
Washoe	0-11	Extremely stony fine sandy loam.	SM	A-1, A-2	45-55	75-85	50-60	40-55	15-30	---	NP
	11-42	Very gravelly sandy clay loam, very gravelly sandy loam.	GC	A-2, A-6	5-20	55-70	45-55	40-50	20-40	25-35	10-15
	42-60	Stratified gravelly loamy coarse sand to very cobbly loamy coarse sand.	GP-GM, GM, SP-SM, SM	A-1	10-50	50-80	50-75	20-40	5-20	---	NP
1331*:											
Sutcliff	0-5	Very stony loam	GC, SC	A-2, A-6	40-50	60-70	40-60	35-55	25-50	25-35	10-15
	5-25	Very cobbly clay loam, very stony clay loam.	CL	A-6	40-50	85-95	75-85	60-85	50-70	35-40	15-20
	25-42	Very cobbly loam	SC	A-6	35-45	70-80	55-65	45-60	35-50	25-35	10-15
	42-53	Cemented	---	---	---	---	---	---	---	---	---
Bundorf	0-2	Very stony loam	GM-GC, GC	A-2	20-30	50-60	40-55	30-40	25-35	20-35	5-15
	2-10	Clay loam, clay	CL, CH	A-7	0	90-100	90-100	85-95	65-85	45-60	20-35
	10-19	Very cobbly loam, very gravelly clay loam.	GC	A-2	10-30	50-60	35-45	30-40	25-35	45-60	20-35
	19-27	Indurated	---	---	---	---	---	---	---	---	---
Kleinbush	0-5	Very cobbly loamy sand.	SM	A-2	50-60	85-95	80-90	50-70	10-25	---	NP
	5-38	Clay loam, clay	CL, CH	A-7	0	90-100	90-100	80-100	65-95	40-65	20-35
	38-60	Cobbly sandy clay loam, very gravelly sandy loam, cobbly sandy loam.	SC, SM-SC	A-2, A-4, A-6	10-15	90-100	55-80	35-65	15-40	25-40	5-15

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1340*:											
Hawsley----------	0-8	Sand--------------	SM, SP-SM	A-2, A-3	0	100	90-100	75-90	5-25	---	NP
	8-42	Stratified fine sand to coarse sand.	SM, SP-SM	A-2, A-3	0	85-100	75-100	55-70	5-25	---	NP
	42-60	Sand, fine sand	SM, SP-SM	A-2, A-3	0	100	100	75-90	5-25	---	NP
Ruhe-------------	0-6	Gravelly loamy sand.	SM, SP-SM	A-1	0-10	75-90	50-75	30-50	5-25	---	NP
	6-14	Gravelly loamy sand, gravelly sand, loamy sand.	SM, SP-SM	A-1	0-10	75-90	50-85	30-50	5-25	---	NP
	14-35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
	35-60	Stratified very cobbly coarse sand to sand.	SP, GP	A-1	5-50	40-65	30-60	10-35	0-5	---	NP
Bluewing---------	0-9	Very stony loamy sand.	GP-GM	A-1	20-40	30-40	25-35	15-25	5-10	---	NP
	9-60	Stratified extremely gravelly sand to very gravelly loamy coarse sand.	GP-GM	A-1	15-25	30-40	25-35	15-25	5-10	---	NP
1341*:											
Isolde-----------	0-6	Fine sand--------	SP, SP-SM	A-3	0	100	100	75-90	0-10	---	NP
	6-60	Fine sand, sand	SP, SP-SM	A-3	0	100	100	60-85	0-10	---	NP
Dune land.											
1342*:											
Isolde-----------	0-6	Fine sand--------	SP, SP-SM	A-3	0	100	100	75-90	0-10	---	NP
	6-60	Fine sand, sand	SP, SP-SM	A-3	0	100	100	60-85	0-10	---	NP
Playas.											
1344*:											
Isolde-----------	0-6	Fine sand--------	SP, SP-SM	A-3	0	100	100	75-90	0-10	---	NP
	6-60	Fine sand, sand	SP, SP-SM	A-3	0	100	100	60-85	0-10	---	NP
Toulon-----------	0-6	Very gravelly loam.	GM, SM	A-1, A-2	0-10	55-70	40-50	30-45	20-35	---	NP
	6-13	Very gravelly sandy loam, very gravelly loam, very gravelly coarse sandy loam.	GM, GP-GM	A-1, A-2	0-5	40-60	25-40	15-35	5-30	---	NP
	13-60	Stratified gravelly coarse sand to very cobbly coarse sand.	GP, GW, GP-GM, GW-GM	A-1	25-50	40-50	25-40	5-20	0-10	---	NP
1345-------------- Hawsley	0-8	Sand--------------	SM, SP-SM	A-2, A-3	0	100	90-100	75-90	5-25	---	NP
	8-42	Stratified fine sand to coarse sand.	SM, SP-SM	A-2, A-3	0	85-100	75-100	55-70	5-25	---	NP
	42-60	Sand, fine sand	SM, SP-SM	A-2, A-3	0	100	100	75-90	5-25	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1350*:											
Stumble----------	0-2	Loamy sand--------	SM	A-2	0-5	85-100	85-100	55-75	15-25	---	NP
	2-24	Loamy sand, loamy fine sand.	SM	A-2	0-5	85-100	85-100	55-75	15-25	---	NP
	24-60	Gravelly loamy sand, gravelly loamy fine sand.	SM	A-1	0-10	75-85	50-70	40-50	15-25	---	NP
Ruhe-------------	0-6	Gravelly loamy sand.	SM, SP-SM	A-1	0-10	75-90	50-75	30-50	5-25	---	NP
	6-14	Gravelly loamy sand, gravelly sand, loamy sand.	SM, SP-SM	A-1	0-10	75-90	50-85	30-50	5-25	---	NP
	14-35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
	35-60	Stratified very cobbly coarse sand to sand.	SP, GP	A-1	5-50	40-65	30-60	10-35	0-5	---	NP
Bluewing---------	0-9	Very stony loamy sand.	GP-GM	A-1	20-40	30-40	25-35	15-25	5-10	---	NP
	9-54	Stratified extremely gravelly sand to very gravelly loamy coarse sand.	GP-GM	A-1	15-25	30-40	25-35	15-25	5-10	---	NP
1351--------------- Stumble	0-6	Loamy sand--------	SM	A-2	0-5	85-100	85-100	55-75	15-25	---	NP
	6-29	Loamy sand, loamy fine sand.	SM	A-2	0-5	85-100	85-100	55-75	15-25	---	NP
	29-50	Gravelly loamy sand, gravelly loamy fine sand.	SM	A-1	0-10	75-85	50-70	40-50	15-25	---	NP
1360*:											
Trocken----------	0-3	Very stony sandy loam.	SM	A-2, A-4	10-15	65-85	60-80	40-60	25-40	20-25	NP-5
	3-60	Stratified extremely gravelly loamy coarse sand to very cobbly loam.	GP-GM, GM-GC	A-2	5-20	20-60	15-50	10-35	5-25	20-30	5-10
Stumble----------	0-2	Loamy sand--------	SM	A-2	0-5	85-100	85-100	55-75	15-25	---	NP
	2-24	Loamy sand, loamy fine sand.	SM	A-2	0-5	85-100	85-100	55-75	15-25	---	NP
	24-60	Gravelly loamy sand, gravelly loamy fine sand.	SM	A-1	0-10	75-85	50-70	40-50	15-25	---	NP
Bluewing---------	0-9	Very stony loamy sand.	GP-GM	A-1	20-40	30-40	25-35	15-25	5-10	---	NP
	9-54	Stratified extremely gravelly sand to very gravelly loamy coarse sand.	GP-GM	A-1	15-25	30-40	25-35	15-25	5-10	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1361*:											
Trocken	0-3	Very stony sandy loam.	SM	A-2, A-4	10-15	65-85	60-80	40-60	25-40	20-25	NP-5
	3-60	Stratified extremely gravelly loamy coarse sand to very cobbly loam.	GP-GM, GM-GC	A-2	5-20	20-60	15-50	10-35	5-25	20-30	5-10
Ruhe	0-6	Very stony loamy sand.	SM	A-1, A-2	20-30	80-100	70-100	30-60	10-35	---	NP
	6-14	Gravelly loamy sand, gravelly sand, loamy sand.	SM, SP-SM	A-1	0-10	75-90	50-85	30-50	5-25	---	NP
	14-35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
	35-60	Stratified very cobbly coarse sand to sand.	SP, GP	A-1	5-50	40-65	30-60	10-35	0-5	---	NP
Bluewing	0-9	Very stony loamy sand.	GP-GM	A-1	20-40	30-40	25-35	15-25	5-10	---	NP
	9-54	Stratified extremely gravelly sand to very gravelly loamy coarse sand.	GP-GM	A-1	15-25	30-40	25-35	15-25	5-10	---	NP
1362*:											
Trocken	0-3	Very stony sandy loam.	SM	A-2, A-4	10-15	65-85	60-80	40-60	25-40	20-25	NP-5
	3-60	Stratified extremely gravelly loamy coarse sand to very cobbly loam.	GP-GM, GM-GC	A-2	5-20	20-60	15-50	10-35	5-25	20-30	5-10
Badland.											
1363 Trocken	0-3	Very stony sandy loam.	SM	A-2, A-4	10-15	65-85	60-80	40-60	25-40	20-25	NP-5
	3-60	Stratified extremely gravelly loamy coarse sand to very cobbly loam.	GP-GM, GM-GC	A-2	5-20	20-60	15-50	10-35	5-25	20-30	5-10
1364*:											
Trocken	0-3	Very stony sandy loam.	SM	A-2, A-4	10-15	65-85	60-80	40-60	25-40	20-25	NP-5
	3-60	Stratified extremely gravelly loamy coarse sand to very cobbly loam.	GP-GM, GM-GC	A-2	5-20	20-60	15-50	10-35	5-25	20-30	5-10

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1364*:											
Wrango----------	0-8	Gravelly loamy sand.	SM	A-1	0-5	60-80	55-75	15-40	10-25	---	NP
	8-60	Extremely gravelly loamy coarse sand, extremely gravelly sand, extremely gravelly loamy sand.	GP, GP-GM, GM	A-1	5-40	25-40	15-30	5-20	0-15	---	NP
1370*:											
Singatse--------	0-2	Very gravelly sandy loam.	SM	A-1	0-10	70-80	45-55	30-40	15-25	15-25	NP-5
	2-6	Very gravelly sandy loam, very gravelly loam.	SM	A-1, A-2	10-30	60-70	30-50	20-30	10-30	15-25	NP-5
	6-12	Weathered bedrock	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Fireball--------	0-3	Extremely stony fine sandy loam.	SM-SC	A-2, A-4	40-50	80-90	70-80	50-70	30-45	20-25	5-10
	3-24	Very cobbly loam, very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	25-40	60-70	50-60	40-60	30-50	25-40	10-20
	24-47	Extremely cobbly loam, very gravelly silt loam.	GM-GC	A-2, A-4	45-55	60-70	40-50	35-50	25-40	20-25	5-10
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rednik----------	0-6	Very stony sandy loam.	GM	A-1, A-2	30-35	45-65	40-60	30-45	15-35	---	NP
	6-20	Very gravelly sandy loam, extremely gravelly loam, very gravelly sandy clay loam.	GC	A-2	5-30	35-60	30-50	20-35	15-30	25-35	10-15
	20-65	Very gravelly sandy loam, very gravelly sand, extremely gravelly loamy sand.	GP-GM, GM	A-1	5-30	35-60	30-50	15-35	5-25	---	NP
1371*:											
Singatse--------	0-2	Very gravelly sandy loam.	SM	A-1	0-10	70-80	45-55	30-40	15-25	15-25	NP-5
	2-6	Very gravelly sandy loam, very gravelly loam.	SM	A-1, A-2	10-30	60-70	30-50	20-30	10-30	15-25	NP-5
	6-12	Weathered bedrock	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Flex------------	0-3	Very gravelly sandy loam.	GM, SM	A-1	0-10	40-65	40-50	30-40	15-25	15-25	NP-5
	3-10	Very gravelly sandy clay loam, very gravelly sandy loam.	GM-GC, GC	A-2	0-5	50-60	40-50	30-45	15-25	15-25	5-15
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1371*:											
Acrelane	0-6	Very stony sandy loam.	SM	A-1, A-2	25-40	90-100	60-75	35-50	15-30	---	NP
	6-10	Very gravelly sandy clay loam, very gravelly coarse sandy loam.	SC, SM-SC	A-2	0-5	80-100	30-50	30-45	15-30	20-30	5-15
	10	Weathered bedrock	---	---	---	---	---	---	---	---	---
1372*:											
Singatse	0-2	Very gravelly sandy loam.	SM	A-1	0-10	70-80	45-55	30-40	15-25	15-25	NP-5
	2-6	Very gravelly sandy loam, very gravelly loam.	SM	A-1, A-2	10-30	60-70	30-50	20-30	10-30	15-25	NP-5
	6-12	Weathered bedrock	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Isolde	0-6	Fine sand	SP, SP-SM	A-3	0	100	100	75-90	0-10	---	NP
	6-60	Fine sand, sand	SP, SP-SM	A-3	0	100	100	60-85	0-10	---	NP
1373*:											
Singatse	0-2	Very gravelly sandy loam.	SM	A-1	0-10	70-80	45-55	30-40	15-25	15-25	NP-5
	2-6	Very gravelly sandy loam, very gravelly loam.	SM	A-1, A-2	10-30	60-70	30-50	20-30	10-30	15-25	NP-5
	6-12	Weathered bedrock	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Mizel	0-3	Very gravelly coarse sandy loam.	GM	A-1	5-10	40-60	30-40	15-30	10-25	---	NP
	3-7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Stingdorn	0-4	Extremely stony loam.	GC	A-2	25-50	35-50	30-40	25-40	20-30	25-35	10-15
	4-9	Very gravelly clay loam.	SC, GC	A-2	0-15	60-80	30-40	30-40	25-35	35-40	15-20
	9-12	Very gravelly sandy loam, extremely gravelly sandy loam.	GP-GM, SP-SM, GM, SM	A-1	0-15	50-75	25-50	10-40	5-15	---	NP
	12-13	Indurated	---	---	---	---	---	---	---	---	---
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1374*:											
Singatse	0-2	Very gravelly sandy loam.	SM	A-1	0-10	70-80	45-55	30-40	15-25	15-25	NP-5
	2-6	Very gravelly sandy loam, very gravelly loam.	SM	A-1, A-2	10-30	60-70	30-50	20-30	10-30	15-25	NP-5
	6-12	Weathered bedrock	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1374*:											
Fireball--------	0-3	Extremely stony fine sandy loam.	SM-SC	A-2, A-4	40-50	80-90	70-80	50-70	30-45	20-25	5-10
	3-24	Very cobbly loam, very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	25-40	60-70	50-60	40-60	30-50	25-40	10-20
	24-47	Extremely cobbly loam, very gravelly silt loam.	GM-GC	A-2, A-4	45-55	60-70	40-50	35-50	25-40	20-25	5-10
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Osobb-----------	0-2	Extremely stony fine sandy loam.	GP-GM, GM, GM-GC	A-1, A-2	50-70	35-55	30-50	20-40	5-25	20-30	NP-10
	2-11	Very cobbly very fine sandy loam, extremely cobbly fine sandy loam, very gravelly loam.	GP-GM, GM, GM-GC	A-1, A-2	45-55	25-60	20-50	15-35	5-20	20-30	NP-10
	11-13	Indurated--------	---	---	---	---	---	---	---	---	---
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1380*:											
Stingdorn-------	0-4	Extremely stony loam.	GC	A-2	25-50	35-50	30-40	25-40	20-30	25-35	10-15
	4-9	Very gravelly clay loam.	SC, GC	A-2	0-15	60-80	30-40	30-40	25-35	35-40	15-20
	9-12	Very gravelly sandy loam, extremely gravelly sandy loam.	GP-GM, SP-SM, GM, SM	A-1	0-15	50-75	25-50	10-40	5-15	---	NP
	12-13	Indurated--------	---	---	---	---	---	---	---	---	---
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Singatse--------	0-2	Very gravelly sandy loam.	SM	A-1	0-10	70-80	45-55	30-40	15-25	15-25	NP-5
	2-6	Very gravelly sandy loam, very gravelly loam.	SM	A-1, A-2	10-30	60-70	30-50	20-30	10-30	15-25	NP-5
	6-12	Weathered bedrock.	---	---	---	---	---	---	---	---	---
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1390*:											
Pirouette-------	0-3	Very stony very fine sandy loam.	SM, SM-SC	A-4	35-50	65-80	65-75	55-70	35-50	20-30	NP-10
	3-10	Very cobbly clay loam.	SC, CL, GC	A-6, A-7	30-40	55-75	50-65	40-60	35-55	35-45	15-20
	10-15	Very cobbly sandy loam.	GM	A-1	40-50	40-55	35-50	25-40	10-25	---	NP
	15-16	Indurated--------	---	---	---	---	---	---	---	---	---
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1390*:											
Osobb----------	0-4	Very stony very fine sandy loam.	SM, SM-SC, GM, GM-GC	A-1, A-2, A-4	30-50	60-80	50-70	45-65	15-40	20-30	NP-10
	4-17	Very cobbly very fine sandy loam, extremely cobbly fine sandy loam, very cobbly loam.	GP-GM, GM, GM-GC	A-1, A-2	45-55	25-60	20-50	15-35	5-20	20-30	NP-10
	17-18	Indurated---------	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1400*:											
Softscrabble----	0-9	Very stony loam	GM-GC	A-4, A-2	25-50	40-60	35-55	25-50	20-40	20-30	5-10
	9-30	Very cobbly clay loam, extremely cobbly clay loam.	CL, GC	A-6, A-2	25-70	50-80	40-70	35-60	30-55	35-40	15-20
	30-78	Clay loam, gravelly clay loam, loam.	CL	A-7	0-10	75-100	60-90	60-80	50-70	40-50	15-25
	78-89	Weathered bedrock	---	---	---	---	---	---	---	---	---
Gabica----------	0-14	Very cobbly sandy loam.	GM, SM	A-2	30-40	60-70	50-70	35-60	20-35	15-25	NP-5
	14-19	Very gravelly clay loam, very gravelly silty clay loam, very stony clay loam.	GC	A-2, A-6	10-50	45-60	25-50	25-50	20-40	25-35	10-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Burnborough-----	0-17	Stony loam-------	CL, CL-ML	A-4, A-6	5-15	85-95	70-85	60-75	50-60	20-35	5-15
	17-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	25-55	20-35	15-30	25-40	10-20
1401*:											
Softscrabble----	0-9	Very stony loam	GM-GC	A-4, A-2	25-50	40-60	35-55	25-50	20-40	20-30	5-10
	9-30	Very cobbly clay loam, extremely cobbly clay loam.	CL, GC	A-6, A-2	25-70	50-80	40-70	35-60	30-55	35-40	15-20
	30-78	Clay loam, gravelly clay loam, loam.	CL	A-7	0-10	75-100	60-90	60-80	50-70	40-50	15-25
	78-89	Weathered bedrock	---	---	---	---	---	---	---	---	---
Gabica----------	0-14	Very cobbly sandy loam.	GM, SM	A-2	30-40	60-70	50-70	35-60	20-35	15-25	NP-5
	14-19	Very gravelly clay loam, very gravelly silty clay loam, very stony clay loam.	GC	A-2, A-6	10-50	45-60	25-50	25-50	20-40	25-35	10-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1401*:											
Sumine----------	0-6	Very stony loam	SM-SC	A-4	10-20	70-85	60-75	50-65	35-50	25-30	5-10
	6-34	Very gravelly clay loam, very cobbly clay loam, very gravelly loam.	GC	A-2, A-6	15-40	45-70	35-65	30-50	30-45	30-40	10-20
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1410*:											
Burnborough-----	0-17	Very gravelly loam.	SC, SM-SC	A-2	5-10	65-75	40-55	30-45	25-35	20-35	5-15
	17-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	25-55	20-35	15-30	25-40	10-20
Ticino----------	0-11	Gravelly fine sandy loam.	SM	A-4	0-15	80-95	60-80	50-70	35-50	15-25	NP-5
	11-22	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SC	A-6	0-15	80-95	60-80	50-70	35-50	25-40	10-20
	22	Weathered bedrock	---	---	---	---	---	---	---	---	---
Gabica----------	0-14	Very cobbly sandy loam.	GM, SM	A-2	30-40	60-70	50-70	35-60	20-35	15-25	NP-5
	14-19	Very gravelly clay loam, very gravelly silty clay loam, very stony clay loam.	GC	A-2, A-6	10-50	45-60	25-50	25-50	20-40	25-35	10-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1411*:											
Burnborough-----	0-17	Very gravelly loam.	SC, SM-SC	A-2	5-10	65-75	40-55	30-45	25-35	20-35	5-15
	17-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	25-55	20-35	15-30	25-40	10-20
Ticino----------	0-11	Gravelly fine sandy loam.	SM	A-4	0-15	80-95	60-80	50-70	35-50	15-25	NP-5
	11-22	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	SC	A-6	0-15	80-95	60-80	50-70	35-50	25-40	10-20
	22	Weathered bedrock	---	---	---	---	---	---	---	---	---
Softscrabble----	0-9	Very stony loam	GM-GC	A-4, A-2	25-50	40-60	35-55	25-50	20-40	20-30	5-10
	9-30	Very cobbly clay loam, extremely cobbly clay loam.	CL, GC	A-6, A-2	25-70	50-80	40-70	35-60	30-55	35-40	15-20
	30-78	Clay loam, gravelly clay loam, loam.	CL	A-7	0-10	75-100	60-90	60-80	50-70	40-50	15-25
	78-89	Weathered bedrock	---	---	---	---	---	---	---	---	---
1420*:											
Barshaad--------	0-1	Very stony loam	SM-SC, CL-ML	A-4	15-30	80-90	80-85	60-80	45-65	20-30	5-10
	1-24	Gravelly clay----	CH	A-7	0-10	60-80	60-75	55-70	50-65	50-65	25-30
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
1420*:											
Fugawee----------	0-9	Stony sandy loam	SM, GM	A-2	5-15	60-80	55-75	50-60	25-35	---	NP
	9-17	Gravelly loam, loam.	SM, GM	A-2, A-4	0-10	60-90	55-80	50-70	30-50	25-40	NP-10
	17-37	Gravelly clay loam, clay loam.	SM, GM, ML	A-6, A-7	0-5	60-90	55-80	50-75	35-55	35-45	10-15
	37	Weathered bedrock	---	---	---	---	---	---	---	---	---
Duckhill Variant	0-8	Very stony sandy loam.	SM-SC	A-2	20-30	85-95	75-85	45-60	25-35	20-30	5-10
	8-13	Very cobbly clay loam, very cobbly loam.	GC	A-6	40-50	55-65	45-55	40-50	35-45	30-40	10-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1430*:											
Fraval-----------	0-9	Very stony loam	CL-ML	A-4	45-55	80-95	80-90	65-85	50-70	20-30	5-10
	9-27	Very gravelly loam, very gravelly clay loam, very cobbly loam.	SC, GC	A-6	20-30	60-90	55-75	45-65	35-50	30-40	10-20
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Booford----------	0-8	Very stony loam	ML, CL-ML	A-4	25-40	80-95	75-90	60-75	50-65	20-30	NP-10
	8-25	Clay, silty clay, gravelly clay.	CH, GC	A-7	0-15	65-100	60-100	50-100	40-95	55-65	30-40
	25-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
Jumbo------------	0-21	Very stony loam	SM-SC, CL-ML	A-4	15-30	70-90	70-80	60-75	40-60	25-30	5-10
	21-54	Very cobbly loam, very cobbly clay loam.	SC, CL, GC	A-6	40-60	65-85	50-85	40-75	35-60	30-40	10-15
	54-70	Weathered bedrock	---	---	---	---	---	---	---	---	---
1431*:											
Fraval-----------	0-9	Very stony loam	CL-ML	A-4	45-55	80-95	80-90	65-85	50-70	20-30	5-10
	9-27	Very gravelly loam, very gravelly clay loam, very cobbly loam.	SC, GC	A-6	20-30	60-90	55-75	45-65	35-50	30-40	10-20
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
Hirschdale-------	0-6	Very stony loam	CL, SC	A-6	25-35	80-90	70-80	45-65	40-55	25-35	10-15
	6-39	Gravelly clay loam, clay.	CL, CH	A-7	0-15	65-95	60-90	55-85	50-80	40-65	15-40
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
Duckhill Variant	0-8	Very stony sandy loam.	SM-SC	A-2	20-30	85-95	75-85	45-60	25-35	20-30	5-10
	8-13	Very cobbly clay loam, very cobbly loam.	GC	A-6	40-50	55-65	45-55	40-50	35-45	30-40	10-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1432*:											
Fraval-----------	0-9	Very stony loam	CL-ML	A-4	45-55	80-95	80-90	65-85	50-70	20-30	5-10
	9-27	Very gravelly loam, very gravelly clay loam, very cobbly loam.	SC, GC	A-6	20-30	60-90	55-75	45-65	35-50	30-40	10-20
	27-40	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1432*:											
Hirschdale-------	0-6	Very stony loam	CL, SC	A-6	25-35	80-90	70-80	45-65	40-55	25-35	10-15
	6-39	Gravelly clay loam, clay.	CL, CH	A-7	0-15	65-95	60-90	55-85	50-80	40-65	15-40
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
Jumbo------------	0-21	Very stony loam	SM-SC, CL-ML	A-4	15-30	70-90	70-80	60-75	40-60	25-30	5-10
	21-54	Very cobbly loam, very cobbly clay loam.	SC, CL, GC	A-6	40-60	65-85	50-85	40-75	35-60	30-40	10-15
	54-70	Weathered bedrock	---	---	---	---	---	---	---	---	---
1440-------------- Tallac	0-26	Very bouldery sandy loam.	GM, SM	A-1	25-50	55-80	50-75	30-45	15-25	---	NP
	26-45	Very stony sandy loam, very stony loam.	GM, SM	A-1	30-55	50-70	45-65	15-35	10-25	---	NP
	45-60	Very bouldery loamy sand.	GM, SM	A-1	30-55	50-70	45-65	15-35	10-25	---	NP
1441-------------- Tallac	0-26	Stony sandy loam	GM, SM	A-1, A-2	10-25	55-80	50-75	30-45	15-35	---	NP
	26-45	Very stony coarse sandy loam, very stony loam.	GM, SM	A-1	30-55	50-70	45-65	15-35	10-35	---	NP
	45-60	Very bouldery loamy sand.	GM, SM	A-1, A-2	30-55	50-70	45-65	15-35	10-25	---	NP
1450*:											
Meiss------------	0-7	Very cobbly sandy loam.	SM, SM-SC	A-4	30-50	75-90	60-75	40-55	35-50	15-25	NP-10
	7-20	Gravelly sandy loam, gravelly loam.	SM, GM	A-2, A-4	5-15	60-85	55-80	40-65	30-50	20-30	NP-5
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sibelia----------	0-6	Very stony sandy loam.	SM, SM-SC	A-1, A-2	25-45	75-80	55-60	35-50	15-35	15-25	NP-10
	6-20	Very gravelly sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	10-25	45-65	35-55	25-35	10-30	15-25	NP-10
	20-47	Very cobbly sandy loam, extremely gravelly sandy loam.	GM, GM-GC	A-1, A-2	45-55	40-60	30-55	20-35	10-30	15-25	NP-10
	47	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1460*:											
Jorge------------	0-9	Very stony sandy loam.	GM, SM	A-1, A-2	5-25	45-85	40-75	25-55	10-30	---	NP
	9-24	Very stony loam, very gravelly loam.	GM	A-1	20-50	45-55	40-50	25-35	10-20	---	NP
	24-52	Very gravelly loam, very gravelly clay loam, extremely gravelly loam.	GM, GM-GC	A-2	5-20	30-60	15-50	10-45	5-35	25-45	5-15
	52-65	Very gravelly sandy loam.	GM	A-1	5-10	30-60	25-50	20-45	10-20	---	NP
	65	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1460*:											
Boomtown---------	0-17	Very stony sandy loam.	SM-SC	A-2, A-4	10-25	70-90	65-80	40-65	30-50	20-30	5-10
	17-22	Gravelly loam, very gravelly loam.	SM-SC, CL-ML, GM-GC	A-2, A-4	0-5	40-80	35-75	30-65	25-55	20-30	5-10
	22-53	Clay loam, clay, gravelly clay.	CL, CH, GC	A-7	0-5	60-100	50-95	45-90	40-80	45-55	20-30
	53-61	Clay loam---------	ML, CL	A-6, A-7	0-10	75-100	75-100	65-85	50-75	35-45	10-20
Fugawee----------	0-5	Very stony sandy loam.	SM, GM	A-2	10-30	60-80	55-75	50-60	25-35	---	NP
	5-17	Gravelly loam, loam, gravelly sandy loam.	SM, GM	A-2, A-4	0-10	60-90	55-80	50-70	30-50	25-40	NP-10
	17-29	Gravelly clay loam, clay loam, cobbly loam.	SM, GM, ML	A-6, A-7	0-25	60-90	55-80	50-75	35-55	35-45	10-15
	29	Weathered bedrock	---	---	---	---	---	---	---	---	---
1470*:											
Carioca----------	0-7	Stony sandy loam	SM, GM	A-1	5-10	55-65	35-45	20-30	10-20	---	NP
	7-30	Very gravelly sandy loam.	GM	A-1	10-20	45-55	30-50	20-30	10-20	---	NP
	30-56	Very gravelly loam, very gravelly clay loam, extremely gravelly loam.	GC, GM-GC	A-2	15-40	40-60	30-55	25-45	15-35	25-35	5-15
	56-65	Gravelly loam----	GC, GM-GC	A-6, A-4	0-5	60-70	50-60	45-55	35-45	25-40	5-15
	65	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sibelia Variant-	0-21	Stony loam--------	SM, SM-SC, GM-GC	A-4	5-20	65-75	60-70	55-65	35-50	15-25	NP-10
	21-60	Very cobbly loam, very cobbly sandy loam.	GM, GM-GC	A-4	30-50	60-70	50-60	45-55	35-45	15-25	NP-10
Fugawee----------	0-9	Very stony sandy loam.	SM, GM	A-2	10-30	60-80	55-75	50-60	25-35	---	NP
	9-17	Gravelly loam, loam.	SM, GM	A-2, A-4	0-10	60-90	55-80	50-70	30-50	25-40	NP-10
	17-37	Gravelly clay loam, clay loam.	SM, GM, ML	A-6, A-7	0-5	60-90	55-80	50-75	35-55	35-45	10-15
	37	Weathered bedrock	---	---	---	---	---	---	---	---	---
1480*:											
Macareeno--------	0-11	Loam-------------	CL, CL-ML, SC, SM-SC	A-4, A-6	0-10	85-95	80-90	60-80	45-55	20-35	5-15
	11-41	Gravelly clay loam.	SC, CL	A-6	0-15	70-90	55-75	50-75	40-60	35-40	15-20
	41-54	Very cobbly loam	SC	A-6, A-2	25-35	75-85	50-70	40-65	30-50	25-35	10-15
Blackwell--------	0-11	Sandy loam--------	SM	A-2	0	90-100	90-100	55-70	25-35	---	NP
	11-60	Stratified clay loam to gravelly coarse sand.	CL-ML, CL, SC, SM-SC	A-4, A-6	0	80-100	75-100	55-80	45-65	25-35	5-15
Carioca----------	0-7	Stony sandy loam	SM, GM	A-1	5-10	55-65	35-45	20-30	10-20	---	NP
	7-30	Very gravelly sandy loam.	GM	A-1	10-20	45-55	30-50	20-30	10-20	---	NP
	30-56	Very gravelly loam, very gravelly clay loam, extremely gravelly loam.	GC, GM-GC	A-2	15-40	40-60	30-55	25-45	15-35	25-35	5-15
	56-65	Gravelly loam----	GC, GM-GC	A-6, A-4	0-5	60-70	50-60	45-55	35-45	25-40	5-15
	65	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1490*:											
Arzo	0-2	Very stony loam	CL, SC	A-6	20-30	80-85	60-70	50-70	35-60	30-35	10-15
	2-27	Clay loam, gravelly clay, clay.	CH, CL	A-7	0-10	90-95	75-90	65-90	50-80	40-55	20-30
	27-35	Gravelly loam	SC, SM-SC, GC, GM-GC	A-2, A-6, A-4	0-10	60-80	55-75	35-60	30-50	25-35	5-15
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
Indiano	0-13	Stony sandy loam	SM	A-1, A-2	20-25	70-85	65-80	40-65	20-35	---	NP
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Barnard	0-15	Stony sandy loam	SM, SM-SC	A-2, A-4	10-25	85-95	80-90	50-80	25-50	15-30	NP-10
	15-26	Clay, silty clay	CH	A-7	0-10	85-95	80-90	70-90	60-85	50-60	30-40
	26	Indurated	---	---	---	---	---	---	---	---	---
1510*:											
Cagle	0-2	Very stony clay loam.	CL	A-6, A-7	25-35	85-95	80-90	75-85	55-65	35-45	15-25
	2-16	Gravelly clay	CL, CH	A-7	0-5	65-75	65-70	60-70	50-60	45-55	20-30
	16-39	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
Nosrac	0-14	Stony clay loam	GC	A-6	5-20	60-70	55-65	50-60	40-50	30-35	10-15
	14-38	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	38-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
Old Camp	0-2	Extremely stony sandy loam.	SM	A-1	25-55	60-70	55-65	35-45	15-25	15-25	NP-5
	2-14	Very cobbly clay loam, very stony sandy clay loam, very stony loam.	GC, SC	A-2, A-6	35-50	65-70	55-65	45-55	30-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1520*:											
Duco	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Smallcone	0-6	Very gravelly coarse sandy loam.	GP-GM, GM, SP-SM, SM	A-1	0-10	40-75	15-50	10-30	5-25	20-30	NP-5
	6	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1520*:											
Cagle------------	0-2	Very stony clay loam.	CL	A-6, A-7	25-35	85-95	80-90	75-85	55-65	35-45	15-25
	2-16	Gravelly clay----	CL, CH	A-7	0-5	65-75	65-70	60-70	50-60	45-55	20-30
	16-39	Very gravelly clay, very cobbly clay loam, extremely gravelly clay.	GC	A-2	5-35	30-55	20-55	20-50	15-35	45-55	20-30
	39	Weathered bedrock	---	---	---	---	---	---	---	---	---
1521*:											
Duco-------------	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Yuko-------------	0-2	Very stony loam	CL, CL-ML	A-6, A-4	10-15	80-95	80-90	70-85	55-75	25-40	5-15
	2-8	Silty clay loam, clay loam.	CL	A-6, A-7	0-5	90-100	80-100	75-95	70-85	35-45	15-25
	8	Weathered bedrock	---	---	---	---	---	---	---	---	---
Lemm-------------	0-19	Very stony sandy loam.	SM	A-2	15-25	75-95	50-75	40-60	25-35	---	NP
	19-40	Very gravelly coarse sandy loam, very gravelly sandy loam.	SM-SC, SC	A-2, A-1	0-5	70-90	35-50	20-30	15-25	20-35	5-15
	40-60	Very gravelly loamy coarse sand, gravelly loamy coarse sand.	SM, SP-SM	A-1	0-5	70-90	35-70	25-35	5-15	---	NP
1522*:											
Duco-------------	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Pahrange---------	0-11	Very stony sandy loam.	SM-SC	A-2, A-4	30-35	75-90	50-80	35-65	15-40	20-25	5-10
	11-26	Gravelly clay loam, cobbly clay loam.	CL, SC	A-6	10-30	80-90	60-85	50-80	40-65	35-40	15-20
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1522*:											
Lemm	0-19	Very stony sandy loam.	SM	A-2	15-25	75-95	50-75	40-60	25-35	---	NP
	19-40	Very gravelly coarse sandy loam, very gravelly sandy loam.	SM-SC, SC	A-2, A-1	0-5	70-90	35-50	20-30	15-25	20-35	5-15
	40-60	Very gravelly loamy coarse sand, gravelly loamy coarse sand.	SM, SP-SM	A-1	0-5	70-90	35-70	25-35	5-15	---	NP
1530*:											
Bombadil	0-4	Very stony sandy loam.	SM	A-2	20-30	70-90	65-85	50-65	25-35	15-25	NP-5
	4-13	Loam, gravelly loam.	CL-ML, CL	A-4, A-6	0-10	75-100	70-90	65-85	50-70	25-35	5-15
	13-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hefed	0-2	Very stony sandy loam.	SM-SC	A-2	30-45	80-85	60-70	40-55	20-35	20-30	5-10
	2-13	Very gravelly sandy loam, very gravelly loam.	GC	A-2	5-10	50-65	35-55	25-50	10-35	25-35	10-15
	13-75	Stratified very gravelly loamy sand to very cobbly sandy loam.	SM	A-1, A-2	15-40	75-85	50-75	30-60	15-35	---	NP
Rubble land.											
1531*:											
Bombadil	0-4	Very stony sandy loam.	SM	A-2	20-30	70-90	65-85	50-65	25-35	15-25	NP-5
	4-13	Loam, gravelly loam.	CL-ML, CL	A-4, A-6	0-10	75-100	70-90	65-85	50-70	25-35	5-15
	13-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hefed	0-2	Very stony sandy loam.	SM-SC	A-2	30-45	80-85	60-70	40-55	20-35	20-30	5-10
	2-13	Very gravelly sandy loam, very gravelly loam.	GC	A-2	5-10	50-65	35-55	25-50	10-35	25-35	10-15
	13-75	Stratified very gravelly loamy sand to very cobbly sandy loam.	SM	A-1, A-2	15-40	75-85	50-75	30-60	15-35	---	NP
Fireball	0-3	Extremely stony fine sandy loam.	SM-SC	A-2, A-4	40-50	80-90	70-80	50-70	30-45	20-25	5-10
	3-24	Very cobbly loam, very gravelly loam, very gravelly clay loam.	GC	A-2, A-6	25-40	60-70	50-60	40-60	30-50	25-40	10-20
	24-47	Very cobbly loam, very gravelly silt loam.	GM-GC	A-2, A-4	45-55	60-70	40-50	35-50	25-40	20-25	5-10
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1540*:											
McQuarrie--------	0-1	Very stony sandy loam.	SM, SM-SC	A-2	25-50	80-100	70-95	50-65	30-35	10-20	NP-10
	1-8	Sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0-15	85-95	80-90	65-80	30-65	20-35	5-15
	8-18	Clay loam, loam, cobbly clay loam.	CL, CL-ML	A-4, A-6	0-15	85-95	80-90	65-80	50-65	20-35	5-15
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tristan----------	0-7	Very stony loam.	GM-GC	A-2, A-4	30-50	55-70	50-65	35-55	30-50	20-30	5-10
	7-28	Very stony loam, very cobbly clay loam, very gravelly clay loam.	GC, SC, CL	A-2, A-6	30-50	40-80	35-70	30-60	25-55	25-40	10-20
	28-49	Extremely cobbly loam, extremely cobbly sandy clay loam.	GC	A-2	55-75	40-50	35-45	15-40	10-35	25-35	10-15
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Arzo-------------	0-2	Very stony loam	CL, SC	A-6	20-30	80-85	60-70	50-70	35-60	30-35	10-15
	2-27	Clay loam, gravelly clay, clay.	CH, CL	A-7	0-10	90-95	75-90	65-90	50-80	40-55	20-30
	27-35	Gravelly loam----	SC, SM-SC, GC, GM-GC	A-2, A-6, A-4	0-10	60-80	55-75	35-60	30-50	25-35	5-15
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
1541*:											
McQuarrie--------	0-3	Very stony sandy loam.	SM, SM-SC	A-2	25-50	80-100	70-95	50-65	30-35	10-20	NP-10
	3-9	Sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0-5	85-95	80-90	65-80	30-65	20-35	5-15
	9-13	Clay loam, loam, cobbly clay loam.	CL, CL-ML	A-4, A-6	0-15	85-95	80-90	65-80	50-65	20-35	5-15
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Duco-------------	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly clay loam.	GC	A-2	15-55	35-50	30-40	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tristan----------	0-7	Very stony loam.	GM-GC	A-2, A-4	30-50	55-70	50-65	35-55	30-50	20-30	5-10
	7-28	Very stony loam, very cobbly clay loam, very gravelly clay loam.	GC, SC, CL	A-2, A-6	30-50	40-80	35-70	30-60	25-55	25-40	10-20
	28-49	Extremely cobbly loam, extremely cobbly sandy clay loam.	GC	A-2	55-75	40-50	35-45	15-40	10-35	25-35	10-15
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
1550*:											
Skedaddle--------	0-8	Very stony loam	GC, SC	A-2, A-6	30-50	60-80	50-70	40-60	30-45	25-35	10-15
	8-11	Weathered bedrock	---	---	---	---	---	---	---	---	---
	11	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1550*:											
Pahrange	0-11	Very stony sandy loam.	SM-SC	A-2, A-4	30-35	75-90	50-80	35-65	15-40	20-25	5-10
	11-26	Gravelly clay loam, cobbly clay loam.	CL, SC	A-6	10-30	80-90	60-85	50-80	40-65	35-40	15-20
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
Lemm	0-19	Very stony sandy loam.	SM	A-2	15-25	75-95	50-75	40-60	25-35	---	NP
	19-40	Very gravelly coarse sandy loam, very gravelly sandy loam.	SM-SC, SC	A-2, A-1	0-5	70-90	35-50	20-30	15-25	20-35	5-15
	40-60	Very gravelly loamy coarse sand, gravelly loamy coarse sand.	SM, SP-SM	A-1	0-5	70-90	35-70	25-35	5-15	---	NP
1570*:											
Bluewing	0-7	Very stony loamy sand.	GP-GM	A-1	20-40	30-40	25-35	15-25	5-10	---	NP
	7-60	Stratified extremely gravelly sand to very gravelly loamy coarse sand.	GP-GM	A-1	15-25	30-40	25-35	15-25	5-10	---	NP
Biddleman	0-3	Gravelly sandy loam.	SM	A-1, A-2	5-10	70-80	60-70	40-55	20-35	---	NP
	3-8	Gravelly clay loam, gravelly loam, gravelly sandy clay loam.	SC, GC	A-2, A-6	0-5	60-75	55-65	40-55	30-45	30-35	10-15
	8-60	Sand and gravel	GP-GM, GP	A-1	5-15	10-30	10-20	5-10	0-10	---	NP
Bundorf	0-2	Very stony loam	GM-GC, GC	A-2	20-30	50-60	40-55	30-40	25-35	20-35	5-15
	2-10	Clay loam, clay	CL, CH	A-7	0	90-100	90-100	85-95	65-85	45-60	20-35
	10-19	Very cobbly loam, very gravelly clay loam.	GC	A-2	10-30	50-60	35-45	30-40	25-35	45-60	20-35
	19-27	Indurated	---	---	---	---	---	---	---	---	---
1580*:											
Frodo	0-6	Very stony loam	CL, CL-ML	A-6, A-4	25-50	85-90	70-85	60-80	50-60	25-35	5-15
	6-18	Clay loam, clay, gravelly clay loam.	CL, CH	A-7	0-5	80-95	65-90	60-90	50-80	40-65	20-35
	18-23	Cemented	---	---	---	---	---	---	---	---	---
	23-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Xman	0-2	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Oppio	0-3	Cobbly sandy loam	SM, SM-SC	A-1, A-2	20-30	70-75	60-70	40-50	20-30	15-25	NP-10
	3-21	Clay, sandy clay	CH	A-7	0-5	90-100	90-100	75-95	55-90	50-60	30-40
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
1590------------- Ruhe	0-6	Stony loamy sand	SM, SP-SM	A-1	0-10	75-90	50-75	30-50	5-25	---	NP
	6-14	Gravelly loamy sand, gravelly sand, loamy sand.	SM, SP-SM	A-1	0-10	75-90	50-85	30-50	5-25	---	NP
	14-35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
	35-60	Stratified very cobbly coarse sand to sand.	SP, GP	A-1	5-50	40-65	30-60	10-35	0-5	---	NP
1600*: Wrango-----------	0-8	Gravelly loamy sand.	SM	A-1	0-5	60-80	55-75	15-40	10-25	---	NP
	8-60	Extremely gravelly loamy coarse sand, extremely gravelly sand, extremely gravelly, loamy sand.	GP, GP-GM, GM	A-1	5-40	25-40	15-30	5-20	0-15	---	NP
Ruhe------------	0-6	Stony loamy sand	SM, SP-SM	A-1	0-10	75-90	50-75	30-50	5-25	---	NP
	6-14	Gravelly loamy sand, gravelly sand, loamy sand.	SM, SP-SM	A-1	0-10	75-90	50-85	30-50	5-25	---	NP
	14-35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
	35-60	Stratified very cobbly coarse sand to sand.	SP, GP	A-1	5-50	40-65	30-60	10-35	0-5	---	NP

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
101, 102---------- Aquinas	0-7	12-18	2.0-6.0	0.11-0.13	5.6-6.5	<2	Low-----------	0.28	3	3
	7-37	20-35	0.06-0.2	0.16-0.18	5.6-7.8	<2	Moderate------	0.24		
	37-46	---	---	---	---	---	--------------	----		
	46-60	---	---	---	---	---	--------------	----		
106---------------- Aquinas	0-1	12-18	2.0-6.0	0.11-0.13	5.6-6.5	<2	Low-----------	0.28	3	3
	1-30	20-35	0.06-0.2	0.16-0.18	5.6-7.8	<2	Moderate------	0.24		
	30-36	---	---	---	---	---	--------------	----		
	36-60	---	---	---	---	---	--------------	----		
110---------------- Jowec Variant	0-10	8-18	2.0-6.0	0.10-0.14	5.6-6.5	<2	Low-----------	0.24	1	3
	10-20	35-50	<0.06	0.14-0.16	6.1-7.3	<2	High----------	0.28		
	20-66	25-35	0.2-0.6	0.15-0.18	7.4-8.4	<4	Moderate------	0.32		
111*:										
Jowec Variant---	0-12	8-18	2.0-6.0	0.10-0.14	5.6-6.5	<2	Low-----------	0.24	1	3
	12-22	35-50	<0.06	0.14-0.16	6.1-7.3	<2	High----------	0.28		
	22-60	25-35	0.2-0.6	0.15-0.18	7.4-8.4	<4	Moderate------	0.32		
Greenbrae--------	0-10	10-18	2.0-6.0	0.07-0.10	5.6-6.5	<2	Low-----------	0.15	5	3
	10-28	27-35	0.06-0.2	0.15-0.18	6.1-7.3	<2	Moderate------	0.24		
	28-63	3-15	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low-----------	0.15		
120, 121---------- Doten	0-21	40-60	<0.06	0.14-0.16	>7.3	<16	High----------	0.24	5	4
	21-62	40-60	<0.06	0.14-0.16	>7.3	<16	High----------	0.24		
130---------------- Greenbrae	0-5	10-18	0.6-2.0	0.13-0.17	5.6-7.3	<2	Low-----------	0.17	5	3
	5-22	27-35	0.06-0.2	0.16-0.19	6.1-7.3	<2	Moderate------	0.20		
	22-51	8-15	2.0-6.0	0.10-0.13	6.1-7.3	<2	Low-----------	0.17		
	51-68	27-35	0.06-0.2	0.16-0.18	7.9-9.0	2-4	Moderate------	0.43		
131---------------- Greenbrae	0-10	10-18	2.0-6.0	0.07-0.10	5.6-6.5	<2	Low-----------	0.15	5	3
	10-30	27-35	0.06-0.2	0.15-0.18	6.1-7.3	<2	Moderate------	0.24		
	30-63	3-15	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low-----------	0.15		
132---------------- Greenbrae	0-8	10-18	2.0-6.0	0.07-0.10	5.6-6.5	<2	Low-----------	0.15	5	3
	8-28	27-35	0.06-0.2	0.15-0.18	6.1-7.3	<2	Moderate------	0.24		
	28-63	3-15	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low-----------	0.15		
134---------------- Greenbrae	0-6	10-18	0.6-2.0	0.13-0.17	5.6-7.3	<2	Low-----------	0.17	5	3
	6-24	27-35	0.06-0.2	0.16-0.19	6.1-7.3	<2	Moderate------	0.20		
	24-52	8-15	2.0-6.0	0.10-0.13	6.1-7.3	<2	Low-----------	0.17		
	52-68	27-35	0.06-0.2	0.16-0.18	7.9-9.0	2-4	Moderate------	0.43		
136---------------- Greenbrae	0-12	10-18	2.0-6.0	0.07-0.10	5.6-6.5	<2	Low-----------	0.15	5	3
	12-32	27-35	0.06-0.2	0.15-0.18	6.1-7.3	<2	Moderate------	0.24		
	32-63	3-15	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low-----------	0.15		
140---------------- Haybourne	0-10	2-10	6.0-20	0.07-0.08	6.6-7.8	<2	Low-----------	0.15	5	2
	10-26	8-18	2.0-6.0	0.10-0.12	6.6-8.4	<2	Low-----------	0.28		
	26-63	5-12	2.0-20	0.07-0.10	6.6-8.4	<2	Low-----------	0.15		
141---------------- Haybourne	0-10	2-10	6.0-20	0.07-0.08	6.6-7.8	<2	Low-----------	0.15	5	2
	10-26	8-18	2.0-6.0	0.10-0.12	6.6-8.4	<2	Low-----------	0.28		
	26-60	5-12	2.0-20	0.07-0.10	6.6-8.4	<2	Low-----------	0.15		
142---------------- Haybourne	0-12	2-10	6.0-20	0.07-0.08	6.6-7.8	<2	Low-----------	0.15	5	2
	12-28	8-18	2.0-6.0	0.10-0.12	6.6-8.4	<2	Low-----------	0.28		
	28-60	5-12	2.0-20	0.07-0.10	6.6-8.4	<2	Low-----------	0.15		
150, 151---------- Doten Variant	0-5	40-55	<0.06	0.15-0.17	>8.4	>4	High----------	0.43	5	4
	5-72	40-60	<0.06	0.15-0.17	>8.4	4-16	High----------	0.37		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
160 Incy	0-9	0-5	>20	0.05-0.07	6.6-7.3	<2	Low	0.10	5	1
	9-60	0-5	>20	0.05-0.07	6.6-7.8	<2	Low	0.10		
161 Incy	0-12	0-5	>20	0.05-0.07	6.6-7.3	<2	Low	0.10	5	1
	12-60	0-5	>20	0.05-0.07	6.6-7.8	<2	Low	0.10		
171 Indian Creek	0-7	8-18	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.24	1	4
	7-18	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	18-25	---	---	---	---	---	---	---		
	25-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low	0.17		
172, 173 Indian Creek	0-8	8-18	2.0-6.0	0.08-0.12	6.1-7.8	<2	Low	0.24	1	3
	8-18	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	18-25	---	---	---	---	---	---	---		
	25-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low	0.17		
174 Indian Creek	0-7	8-20	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low	0.17	1	8
	7-19	40-55	<0.06	0.14-0.16	6.1-7.3	<2	High	0.24		
	19-23	---	---	---	---	---	---	---		
	23-60	---	---	---	---	---	---	---		
175 Indian Creek	0-7	15-25	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.28	1	7
	7-19	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	19-23	---	---	---	---	---	---	---		
	23-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low	0.17		
176*:										
Indian Creek	0-7	15-25	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.28	1	7
	7-19	35-55	<0.06	0.14-0.16	6.1-7.8	<2	High	0.24		
	19-23	---	---	---	---	---	---	---		
	23-60	5-20	0.2-6.0	<0.03	6.6-9.0	<4	Low	0.17		
Reno	0-2	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.17	2	4
	2-24	35-60	<0.06	0.12-0.16	6.1-7.3	<2	High	0.24		
	24-47	---	---	---	---	---	---	---		
	47	---	---	---	---	---	---	---		
Washoe	0-8	10-18	0.6-2.0	0.06-0.08	6.1-7.3	<2	Low	0.10	3	8
	8-38	18-27	0.2-0.6	0.07-0.10	6.1-7.3	<2	Moderate	0.17		
	38-60	3-10	>20	0.03-0.05	6.1-7.3	<2	Low	0.10		
190 Manogue	0-2	40-55	<0.06	0.14-0.16	6.1-8.4	<2	High	0.24	5	4
	2-63	40-55	<0.06	0.13-0.15	7.4-8.4	<4	High	0.28		
	63-72	---	---	---	---	---	---	---		
191 Manogue	0-3	40-55	<0.06	0.14-0.16	6.1-8.4	<2	High	0.24	5	4
	3-63	40-55	<0.06	0.13-0.15	7.4-8.4	<4	High	0.28		
	63-72	---	---	---	---	---	---	---		
192 Manogue	0-4	40-55	<0.06	0.14-0.16	6.1-8.4	<2	High	0.24	5	4
	4-63	40-55	<0.06	0.13-0.15	7.4-8.4	<4	High	0.28		
	63-72	---	---	---	---	---	---	---		
200 Northmore	0-15	5-15	2.0-6.0	0.13-0.15	5.6-7.3	<2	Low	0.15	5	3
	15-45	35-45	0.06-0.2	0.14-0.18	5.6-7.3	<2	High	0.20		
	45-60	15-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low	0.15		
201 Northmore	0-15	5-15	2.0-6.0	0.13-0.15	5.6-7.3	<2	Low	0.15	5	3
	15-45	35-45	0.06-0.2	0.14-0.18	5.6-7.3	<2	High	0.20		
	45-60	15-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low	0.15		
202, 203 Northmore	0-10	5-15	2.0-6.0	0.13-0.15	5.6-7.3	<2	Low	0.15	5	3
	10-45	35-45	0.06-0.2	0.14-0.18	5.6-7.3	<2	High	0.20		
	45-60	15-25	0.6-2.0	0.12-0.14	6.1-7.3	<2	Low	0.15		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
210, 211-----------Luppino	0-8	5-15	2.0-6.0	0.08-0.10	5.6-7.3	<2	Low-----------	0.24	1	4
	8-14	18-30	0.2-0.6	0.15-0.18	5.6-7.3	<2	Moderate------	0.20		
	14-23	---	---	---	---	---	--------------	----		
	23	---	---	---	---	---	--------------	----		
221---------------Oppio	0-3	8-20	2.0-6.0	0.07-0.11	5.6-7.3	<2	Low-----------	0.28	3	4
	3-21	35-50	0.06-0.2	0.14-0.17	5.6-7.3	<2	High----------	0.20		
	21	---	---	---	---	---	--------------	----		
222---------------Oppio	0-5	8-20	2.0-6.0	0.07-0.11	5.6-7.3	<2	Low-----------	0.28	3	4
	5-21	35-50	0.06-0.2	0.14-0.17	5.6-7.3	<2	High----------	0.20		
	21	---	---	---	---	---	--------------	----		
223*:										
Oppio------------	0-4	8-20	2.0-6.0	0.07-0.11	5.6-7.3	<2	Low-----------	0.28	3	4
	4-21	35-50	0.06-0.2	0.14-0.17	5.6-7.3	<2	High----------	0.20		
	21	---	---	---	---	---	--------------	----		
Rezave-----------	0-4	12-18	0.6-2.0	0.06-0.08	6.6-8.4	<2	Low-----------	0.24	1	8
	4-13	35-55	0.06-0.2	0.12-0.15	7.9-9.0	2-4	High----------	0.37		
	13-19	35-45	0.2-0.6	0.09-0.12	>8.4	2-8	Moderate------	0.37		
	19	---	---	---	---	---	--------------	----		
Rock outcrop.										
230---------------Cradlebaugh	0-10	20-27	0.6-2.0	0.18-0.20	>7.8	4-8	Moderate------	0.32	5	6
	10-35	20-30	0.2-0.6	0.18-0.20	>7.8	>2	Moderate------	0.37		
	35-60	5-15	2.0-6.0	0.13-0.15	7.9-8.4	>2	Low-----------	0.32		
240---------------Updike	0-2	10-15	0.6-2.0	0.13-0.15	>7.8	2-4	Low-----------	0.37	5	5
	2-20	35-50	<0.06	0.14-0.16	>7.8	2-8	High----------	0.24		
	20-63	30-45	0.06-0.2	0.14-0.17	>9.0	4-16	High----------	0.24		
241---------------Updike	0-2	10-15	0.6-2.0	0.13-0.15	>9.0	2-4	Low-----------	0.37	5	5
	2-36	35-50	<0.06	0.14-0.16	>9.0	2-8	High----------	0.24		
	36-47	30-45	0.06-0.2	0.15-0.17	>9.0	4-8	High----------	0.20		
	47-63	3-10	>20	0.03-0.06	>9.0	8-16	Low-----------	0.10		
250---------------Cassiro	0-15	8-18	2.0-6.0	0.10-0.12	5.6-6.5	<2	Low-----------	0.24	2	4
	15-45	35-50	0.2-0.6	0.08-0.11	5.6-6.5	<2	Moderate------	0.20		
	45-60	---	---	---	---	---	--------------	----		
251---------------Cassiro	0-12	8-18	2.0-6.0	0.10-0.12	5.6-6.5	<2	Low-----------	0.24	2	4
	12-40	35-45	0.2-0.6	0.08-0.11	5.6-6.5	<2	Moderate------	0.20		
	40-60	---	---	---	---	---	--------------	----		
252---------------Cassiro	0-13	8-18	2.0-6.0	0.10-0.12	5.6-6.5	<2	Low-----------	0.24	2	4
	13-40	35-50	0.2-0.6	0.08-0.11	5.6-6.5	<2	Moderate------	0.20		
	40-60	---	---	---	---	---	--------------	----		
260*:										
Acrelane---------	0-6	8-15	2.0-6.0	0.08-0.12	5.6-6.5	<2	Low-----------	0.17	1	4
	6-10	18-30	0.6-2.0	0.12-0.15	6.6-7.8	<2	Moderate------	0.20		
	10	---	---	---	---	---	--------------	----		
Rock outcrop.										
262---------------Acrelane	0-4	8-15	2.0-6.0	0.08-0.12	5.6-6.5	<2	Low-----------	0.17	1	4
	4-10	18-30	0.6-2.0	0.12-0.15	6.6-7.8	<2	Moderate------	0.20		
	10	---	---	---	---	---	--------------	----		
280---------------Wedekind	0-2	10-15	2.0-6.0	0.13-0.16	6.1-7.3	<2	Low-----------	0.24	1	4
	2-14	22-32	0.2-0.6	0.15-0.20	6.1-7.3	<2	Moderate------	0.20		
	14-60	---	---	---	---	---	--------------	----		
281---------------Wedekind	0-2	10-15	2.0-6.0	0.13-0.16	6.1-7.3	<2	Low-----------	0.24	1	4
	2-14	22-32	0.2-0.6	0.15-0.20	6.1-7.3	<2	Moderate------	0.20		
	14-60	---	---	---	---	---	--------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
282----------- Wedekind	0-4	8-15	2.0-6.0	0.07-0.12	6.1-7.3	<2	Low-----------	0.15	1	5
	4-14	22-32	0.2-0.6	0.15-0.20	6.1-7.3	<2	Moderate-----	0.20		
	14-60	---	---	---	---	---	-------------	----		
290----------- Verdico Variant	0-5	5-15	0.2-0.6	0.12-0.17	6.1-7.3	<2	Low-----------	0.24	2	5
	5-28	40-50	0.06-0.2	0.12-0.17	6.1-7.3	<2	High----------	0.28		
	28	---	---	---	---	---	-------------	----		
291----------- Verdico Variant	0-6	5-15	0.2-0.6	0.12-0.17	6.1-7.3	<2	Low-----------	0.20	2	6
	6-28	40-50	0.06-0.2	0.12-0.17	6.1-7.3	<2	High----------	0.28		
	28	---	---	---	---	---	-------------	----		
300----------- Surgem	0-4	5-15	2.0-6.0	0.07-0.10	6.1-7.8	<2	Low-----------	0.15	2	4
	4-24	35-50	0.06-0.2	0.10-0.12	6.1-7.8	<2	Moderate-----	0.20		
	24-30	---	---	---	---	---	-------------	----		
301*:										
Surgem----------	0-5	5-15	2.0-6.0	0.07-0.10	6.1-7.8	<2	Low-----------	0.15	2	4
	5-24	35-50	0.06-0.2	0.10-0.12	6.1-7.8	<2	Moderate-----	0.20		
	24-30	---	---	---	---	---	-------------	----		
Rock outcrop.										
302*:										
Surgem----------	0-6	5-15	2.0-6.0	0.07-0.10	6.1-7.8	<2	Low-----------	0.15	2	4
	6-24	35-50	0.06-0.2	0.10-0.12	6.1-7.8	<2	Moderate-----	0.20		
	24-30	---	---	---	---	---	-------------	----		
Rock outcrop.										
310*:										
Risley----------	0-4	15-27	0.2-0.6	0.09-0.12	5.6-7.3	<2	Moderate-----	0.32	2	7
	4-24	35-45	0.06-0.2	0.16-0.18	6.1-8.4	<2	High----------	0.20		
	24-40	---	---	---	---	---	-------------	----		
Rock outcrop.										
311*:										
Risley----------	0-3	15-27	0.2-0.6	0.09-0.12	5.6-7.3	<2	Moderate-----	0.32	2	7
	3-23	35-45	0.06-0.2	0.16-0.18	6.1-8.4	<2	High----------	0.20		
	23-40	---	---	---	---	---	-------------	----		
Rock outcrop.										
312----------- Risley	0-3	15-27	0.2-0.6	0.10-0.13	5.6-7.3	<2	Moderate-----	0.32	2	6
	3-23	35-45	0.06-0.2	0.15-0.17	6.1-8.4	<2	High----------	0.32		
	23-40	---	---	---	---	---	-------------	----		
313----------- Risley	0-4	28-32	0.06-0.2	0.16-0.18	6.1-8.4	<2	Moderate-----	0.32	2	6
	4-40	35-45	0.06-0.2	0.15-0.17	6.1-8.4	<2	High----------	0.32		
	40-60	---	---	---	---	---	-------------	----		
314*:										
Risley----------	0-6	15-27	0.2-0.6	0.09-0.12	5.6-7.3	<2	Moderate-----	0.32	2	7
	6-28	35-45	0.06-0.2	0.16-0.18	6.1-8.4	<2	High----------	0.20		
	28-40	---	---	---	---	---	-------------	----		
Xman------------	0-3	12-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low-----------	0.32	1	5
	3-14	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	14-29	---	---	---	---	---	-------------	----		
	29	---	---	---	---	---	-------------	----		
Rock outcrop.										
341----------- Yuko	0-2	20-27	0.2-0.6	0.15-0.17	6.1-7.3	<2	Moderate-----	0.28	1	5
	2-8	32-35	0.2-0.6	0.15-0.17	6.1-7.8	<2	Moderate-----	0.37		
	8-40	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS --Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
342*:										
Yuko------------	0-3	15-27	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.24	1	6
	3-9	32-35	0.2-0.6	0.15-0.17	6.1-7.8	<2	Moderate-----	0.37		
	9-40	---	---	---	---	---	-------------	----		
Reywat----------	0-6	10-18	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low----------	0.28	1	8
	6-14	24-35	0.2-0.6	0.14-0.16	7.4-7.8	<2	Moderate-----	0.15		
	14	---	---	---	---	---	-------------	----		
Rock outcrop.										
350-------------- Mizel	0-3	5-15	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low----------	0.17	1	5
	3-7	---	---	---	---	---	-------------	----		
351*:										
Mizel-----------	0-3	5-15	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low----------	0.17	1	5
	3-7	---	---	---	---	---	-------------	----		
Skedaddle-------	0-5	18-27	0.6-2.0	0.06-0.10	6.6-7.8	<2	Low----------	0.28	1	7
	5-8	---	---	---	---	---	-------------	----		
	8-20	---	---	---	---	---	-------------	----		
Rock outcrop.										
360*. Pits										
370-------------- Lemm	0-19	5-15	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low----------	0.17	5	5
	19-40	10-18	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low----------	0.20		
	40-60	3-8	6.0-20	0.06-0.08	6.6-7.3	<2	Low----------	0.10		
390-------------- Duckhill	0-3	10-20	0.6-2.0	0.14-0.18	5.6-6.5	<2	Low----------	0.24	1	6
	3-9	20-30	0.6-2.0	0.14-0.18	5.6-6.5	<2	Moderate-----	0.32		
	9-12	---	---	---	---	---	-------------	----		
	12	---	---	---	---	---	-------------	----		
391*:										
Duckhill--------	0-3	10-20	0.6-2.0	0.14-0.18	5.6-6.5	<2	Low----------	0.24	1	6
	3-9	20-30	0.6-2.0	0.14-0.18	5.6-6.5	<2	Moderate-----	0.32		
	9-12	---	---	---	---	---	-------------	----		
	12	---	---	---	---	---	-------------	----		
Hirschdale------	0-6	15-27	0.2-2.0	0.06-0.12	6.1-7.3	<2	Moderate-----	0.20	2	8
	6-39	35-60	0.06-0.2	0.12-0.16	6.1-7.3	<2	High---------	0.24		
	39	---	---	---	---	---	-------------	----		
Fraval----------	0-9	12-20	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low----------	0.28	2	7
	9-27	20-35	0.6-2.0	0.10-0.12	5.6-6.5	<2	Moderate-----	0.24		
	27-40	---	---	---	---	---	-------------	----		
400-------------- Jubilee Variant	0-14	2-8	2.0-6.0	0.08-0.10	>7.8	>8	Low----------	0.15	5	2
	14-60	8-15	2.0-6.0	0.10-0.12	>7.8	>8	Low----------	0.17		
401-------------- Jubilee Variant	0-14	8-15	2.0-6.0	0.08-0.10	7.9-9.0	2-8	Low----------	0.15	5	2
	14-60	8-15	2.0-6.0	0.10-0.12	7.9-9.0	2-8	Low----------	0.17		
403-------------- Jubilee Variant	0-14	10-22	2.0-6.0	0.14-0.18	7.9-9.0	2-8	Low----------	0.24	5	5
	14-60	8-15	2.0-6.0	0.10-0.12	7.9-9.0	2-8	Low----------	0.17		
410-------------- Ophir	0-11	2-8	6.0-20	0.07-0.09	5.6-7.3	<2	Low----------	0.15	4	2
	11-60	3-10	6.0-20	0.05-0.09	5.6-7.3	<2	Low----------	0.15		
411-------------- Ophir	0-12	2-8	6.0-20	0.07-0.09	5.6-7.3	<2	Low----------	0.15	4	2
	12-60	3-10	6.0-20	0.05-0.09	5.6-7.3	<2	Low----------	0.15		
420-------------- Godecke	0-5	3-8	2.0-6.0	0.08-0.12	>8.4	>8	Low----------	0.15	5	2
	5-15	20-35	0.06-0.2	0.15-0.19	>8.4	>8	Moderate-----	0.28		
	15-60	25-30	0.06-0.2	0.15-0.19	>8.4	>8	Moderate-----	0.28		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
423---------------- Godecke Variant	0-12	5-15	2.0-6.0	0.08-0.10	6.6-8.4	2-8	Low-----------	0.15	4	2
	12-25	20-35	0.06-0.2	0.16-0.19	>8.4	4-16	Moderate------	0.28		
	25-42	20-35	0.06-0.2	0.15-0.18	>8.4	4-16	Moderate------	0.28		
	42-60	---	---	---	---	---	--------------	----		
430, 431---------- Sagouspe Variant	0-5	3-12	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low-----------	0.37	4	2
	5-22	2-10	6.0-20	0.06-0.07	6.1-7.3	<2	Low-----------	0.15		
	22-60	3-12	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low-----------	0.32		
440---------------- Jubilee	0-22	5-15	2.0-6.0	0.13-0.15	6.1-7.3	<2	Low-----------	0.15	5	3
	22-60	5-15	6.0-20	0.06-0.08	6.6-7.8	<2	Low-----------	0.10		
441---------------- Jubilee	0-11	28-32	0.6-2.0	0.18-0.20	6.1-7.3	<2	Low-----------	0.24	5	5
	11-60	5-15	6.0-20	0.06-0.08	6.6-7.8	<2	Low-----------	0.10		
442---------------- Jubilee	0-11	5-10	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10	5	2
	11-28	8-18	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low-----------	0.15		
	28-60	5-15	6.0-20	0.06-0.08	6.6-7.8	<2	Low-----------	0.10		
443---------------- Jubilee	0-12	5-10	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10	5	2
	12-30	8-18	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low-----------	0.15		
	30-60	5-15	6.0-20	0.06-0.08	6.6-7.8	<2	Low-----------	0.10		
445---------------- Jubilee	0-22	8-18	2.0-6.0	0.13-0.15	6.1-7.3	<2	Low-----------	0.15	5	3
	22-60	5-15	2.0-6.0	0.07-0.13	6.1-7.3	<2	Low-----------	0.10		
450---------------- Voltaire	0-20	20-27	0.2-0.6	0.15-0.17	>7.8	<4	Moderate------	0.32	5	5
	20-60	27-35	0.06-0.2	0.18-0.20	>7.8	4-8	Moderate------	0.28		
451---------------- Voltaire	0-15	20-27	0.2-0.6	0.18-0.20	>8.4	4-8	Moderate------	0.32	5	6
	15-60	27-35	0.06-0.2	0.18-0.20	>7.8	>4	Moderate------	0.37		
452---------------- Voltaire	0-18	20-27	0.2-0.6	0.18-0.20	>8.4	>16	Moderate------	0.32	5	6
	18-60	27-35	0.06-0.2	0.18-0.20	>7.8	>4	Moderate------	0.37		
454---------------- Voltaire	0-20	40-45	0.06-0.2	0.17-0.19	7.4-8.4	<4	High----------	0.28	5	4
	20-60	20-35	0.06-0.2	0.17-0.19	7.4-8.4	<4	Moderate------	0.32		
455*:										
Voltaire----------	0-20	40-45	0.06-0.2	0.17-0.19	7.4-8.4	<4	High----------	0.28	5	4
	20-60	20-35	0.06-0.2	0.17-0.19	7.4-8.4	<4	Moderate------	0.32		
Truckee-----------	0-12	10-20	0.6-2.0	0.14-0.16	7.9-8.4	2-8	Low-----------	0.43	5	6
	12-60	18-28	0.2-0.6	0.15-0.18	7.9-8.4	2-8	Moderate------	0.24		
456---------------- Voltaire	0-9	30-38	0.06-0.2	0.13-0.17	>7.3	<8	Moderate------	0.43	3	6
	9-36	27-35	0.06-0.2	0.15-0.20	>7.3	<8	Moderate------	0.37		
	36-60	5-15	2.0-6.0	0.05-0.10	>7.3	<8	Low-----------	0.24		
460---------------- Surprise	0-14	3-8	6.0-20.0	0.06-0.08	6.1-7.3	<2	Low-----------	0.17	5	2
	14-37	10-18	2.0-6.0	0.09-0.12	6.1-7.3	<2	Low-----------	0.20		
	37-66	7-12	2.0-6.0	0.06-0.12	6.1-7.3	<2	Low-----------	0.10		
461---------------- Surprise	0-7	5-15	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low-----------	0.20	5	3
	7-24	10-18	2.0-6.0	0.09-0.12	6.1-7.3	<2	Low-----------	0.20		
	24-66	7-12	2.0-6.0	0.06-0.12	6.1-7.3	<2	Low-----------	0.10		
470---------------- Dalzell	0-14	4-10	2.0-6.0	0.10-0.12	>7.8	4-16	Low-----------	0.17	3	2
	14-32	18-35	0.2-0.6	0.17-0.19	>8.4	4-16	Moderate------	0.32		
	32-36	---	---	---	---	---	--------------	----		
	36-60	5-12	2.0-6.0	0.09-0.11	>8.4	2-8	Low-----------	0.24		
480---------------- Holbrook	0-14	3-8	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.17	5	3
	14-60	5-10	2.0-6.0	0.04-0.06	6.1-8.4	<2	Low-----------	0.15		
482---------------- Holbrook	0-10	5-12	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low-----------	0.28	5	4
	10-60	5-10	2.0-6.0	0.04-0.06	6.1-8.4	<2	Low-----------	0.15		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
490------------- Graufels	0-10	2-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10	2	4
	10-22	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10		
	22-40	---	---	---	---	---	-------------	----		
491*:										
Graufels---------	0-10	2-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10	2	4
	10-22	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10		
	22-40	---	---	---	---	---	-------------	----		
Rock outcrop.										
492------------- Graufels	0-12	2-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10	2	4
	12-26	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10		
	26-40	---	---	---	---	---	-------------	----		
493*:										
Graufels---------	0-11	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10	2	3
	11-25	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10		
	25-40	---	---	---	---	---	-------------	----		
Glenbrook--------	0-7	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10	2	3
	7-13	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10		
	13	---	---	---	---	---	-------------	----		
494------------- Graufels	0-9	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10	2	3
	9-24	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10		
	24-40	---	---	---	---	---	-------------	----		
495*:										
Graufels---------	0-9	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10	2	3
	9-23	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10		
	23-40	---	---	---	---	---	-------------	----		
Glenbrook--------	0-7	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10	2	3
	7-13	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10		
	13	---	---	---	---	---	-------------	----		
Rock outcrop.										
496*:										
Graufels---------	0-15	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10	2	3
	15-26	3-10	6.0-20	0.07-0.09	6.1-7.3	<2	Low----------	0.10		
	26-40	---	---	---	---	---	-------------	----		
Glenbrook--------	0-12	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10	2	3
	12-18	0-8	6.0-20	0.05-0.07	6.1-7.3	<2	Low----------	0.10		
	18	---	---	---	---	---	-------------	----		
Haypress---------	0-15	3-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low----------	0.10	3	---
	15-46	0-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low----------	0.10		
	46	---	---	---	---	---	-------------	----		
500, 504--------- Mottsville	0-10	2-8	>6.0	0.06-0.08	5.6-7.3	<2	Low----------	0.10	5	1
	10-60	3-10	>6.0	0.06-0.08	5.6-7.3	<2	Low----------	0.10		
505------------- Mottsville	0-11	3-10	>6.0	0.06-0.08	5.6-7.3	<2	Low----------	0.10	5	3
	11-60	3-10	>6.0	0.06-0.08	5.6-7.3	<2	Low----------	0.10		
510------------- Settlemeyer	0-15	10-20	0.6-2.0	0.13-0.15	>7.3	<8	Low----------	0.24	5	4
	15-39	27-35	0.2-0.6	0.16-0.19	>7.3	<8	Moderate------	0.37		
	39-60	12-20	0.2-2.0	0.07-0.11	6.6-8.4	<8	Low----------	0.24		
513*:										
Settlemeyer------	0-15	10-20	0.6-2.0	0.13-0.15	>7.3	<8	Low----------	0.24	5	4
	15-39	27-35	0.2-0.6	0.16-0.19	>7.3	<8	Moderate------	0.37		
	39-60	12-20	0.2-2.0	0.07-0.11	6.6-8.4	<8	Low----------	0.24		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
513*:										
Notus-----------	0-12	2-7	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low----------	0.20	5	3
	12-60	3-10	2.0-6.0	0.03-0.06	6.1-7.3	<2	Low----------	0.17		
514--------------- Settlemeyer	0-12	15-22	0.6-2.0	0.11-0.13	>7.3	<8	Low----------	0.24	5	5
	12-35	27-35	0.2-0.6	0.16-0.19	>7.3	<8	Moderate-----	0.37		
	35-60	12-20	0.2-2.0	0.07-0.11	6.6-8.4	<8	Low----------	0.24		
520--------------- Dressler	0-19	2-10	2.0-6.0	0.10-0.13	6.1-7.3	<2	Low----------	0.17	5	2
	19-60	3-8	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low----------	0.17		
530--------------- Sagouspe	0-21	0-5	6.0-20	0.05-0.07	6.6-8.4	<2	Low----------	0.15	5	1
	21-60	0-5	6.0-20	0.10-0.13	>7.8	<4	Low----------	0.20		
531--------------- Sagouspe	0-21	5-10	2.0-6.0	0.13-0.15	6.6-8.4	<8	Low----------	0.24	5	3
	21-60	0-5	6.0-20	0.10-0.13	>7.8	<4	Low----------	0.20		
532--------------- Sagouspe	0-10	0-5	6.0-20	0.05-0.07	6.6-8.4	<2	Low----------	0.15	4	2
	10-40	0-5	6.0-20	0.10-0.13	7.4-8.4	<2	Low----------	0.20		
	40-60	0-5	6.0-20	0.03-0.05	7.4-8.4	<2	Low----------	0.15		
550, 551, 553---- Leviathan	0-9	10-20	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low----------	0.17	5	5
	9-60	27-35	0.2-0.6	0.09-0.12	6.1-7.3	<2	Moderate-----	0.17		
554, 557--------- Leviathan	0-11	10-18	0.2-0.6	0.08-0.10	6.1-7.3	<2	Low----------	0.17	5	5
	11-60	27-35	0.2-0.6	0.09-0.11	6.1-7.3	<2	Moderate-----	0.17		
559--------------- Leviathan	0-11	10-18	0.2-0.6	0.05-0.07	6.1-7.3	<2	Low----------	0.15	5	8
	11-60	27-35	0.2-0.6	0.09-0.11	6.1-7.3	<2	Moderate-----	0.17		
570--------------- Turria	0-2	15-25	0.6-2.0	0.16-0.18	6.1-7.8	<2	Moderate-----	0.37	5	5
	2-12	25-35	0.2-0.6	0.17-0.20	6.1-7.8	<2	Moderate-----	0.32		
	12-60	15-25	0.6-2.0	0.18-0.20	6.6-7.8	<2	Moderate-----	0.49		
585*:										
Barnard---------	0-15	5-15	0.6-2.0	0.16-0.19	6.1-7.3	<2	Low----------	0.20	1	4
	15-26	40-50	0.06-0.2	0.13-0.16	6.1-7.3	<2	High---------	0.28		
	26	---	---	---	---	---	-------------	----		
Trosi-----------	0-12	8-15	2.0-6.0	0.07-0.09	5.6-7.3	<2	Low----------	0.10	1	---
	12-19	35-50	<0.06	0.07-0.09	6.1-7.3	<2	Moderate-----	0.10		
	19-34	---	---	---	6.1-7.3	<2	-------------	----		
	34-60	---	---	---	---	---	-------------	----		
590, 591--------- Springmeyer	0-13	18-25	0.2-2.0	0.15-0.16	6.1-7.3	<2	Moderate-----	0.32	5	5
	13-40	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.20		
	40-60	22-30	0.2-2.0	0.10-0.13	6.6-8.4	<2	Moderate-----	0.20		
595--------------- Springmeyer	0-13	18-27	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.32	5	5
	13-40	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.20		
	40-60	18-25	0.2-2.0	0.11-0.13	6.6-8.4	<2	Moderate-----	0.20		
600--------------- Idlewild	0-13	27-32	0.2-0.6	0.15-0.19	6.1-7.3	<2	Moderate-----	0.32	5	6
	13-36	35-45	0.06-0.2	0.15-0.18	6.1-7.3	<2	High---------	0.32		
	36-62	30-40	0.06-0.2	0.15-0.18	6.1-7.3	<2	High---------	0.32		
601--------------- Idlewild	0-13	10-18	0.6-2.0	0.12-0.16	6.1-7.3	<2	Low----------	0.24	5	3
	13-36	35-45	0.06-0.2	0.15-0.18	6.1-7.3	<2	High---------	0.32		
	36-62	30-40	0.06-0.2	0.15-0.18	6.1-7.3	<2	High---------	0.32		
602--------------- Idlewild	0-10	10-18	0.6-2.0	0.12-0.16	6.1-7.3	<2	Low----------	0.20	5	4
	10-36	35-45	0.06-0.2	0.15-0.18	6.1-7.3	<2	High---------	0.32		
	36-60	30-40	0.06-0.2	0.15-0.18	6.1-7.3	<2	High---------	0.32		
612--------------- Verdico	0-2	8-18	2.0-6.0	0.08-0.13	6.1-7.3	<2	Low----------	0.28	2	5
	2-22	45-60	<0.06	0.13-0.18	6.1-7.3	<2	High---------	0.28		
	22-29	45-60	<0.06	0.13-0.18	6.6-7.8	<2	High---------	0.24		
	29-60	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
613, 614---------	0-2	8-18	2.0-6.0	0.08-0.13	6.1-7.3	<2	Low-----------	0.28	2	6
Verdico	2-22	45-60	<0.06	0.13-0.18	6.1-7.3	<2	High----------	0.28		
	22-29	45-60	<0.06	0.13-0.18	6.6-7.8	<2	High----------	0.24		
	29-60	---	---	---	---	---	--------------	----		
615---------------	0-2	8-18	2.0-6.0	0.08-0.13	6.1-7.3	<2	Low-----------	0.32	2	3
Verdico	2-22	45-60	<0.06	0.13-0.18	6.1-7.3	<2	High----------	0.28		
	22-29	45-60	<0.06	0.13-0.18	6.6-7.8	<2	High----------	0.24		
	29-60	---	---	---	---	---	--------------	----		
620, 621---------	0-10	12-18	0.6-2.0	0.08-0.13	6.1-7.3	<2	Low-----------	0.15	5	5
Orr	10-50	18-25	0.2-0.6	0.15-0.17	6.1-7.3	<2	Moderate------	0.20		
	50-60	5-22	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low-----------	0.15		
622---------------	0-12	12-18	0.6-2.0	0.07-0.12	6.1-7.3	<2	Low-----------	0.15	5	4
Orr	12-50	20-25	0.2-0.6	0.15-0.18	6.1-7.3	<2	Moderate------	0.20		
	50-60	3-12	6.0-20	0.05-0.08	6.1-7.3	<2	Low-----------	0.10		
623---------------	0-10	12-18	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low-----------	0.17	5	4
Orr	10-50	18-25	0.2-0.6	0.15-0.17	6.1-7.3	<2	Moderate------	0.20		
	50-60	5-22	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low-----------	0.15		
624---------------	0-12	12-18	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low-----------	0.15	5	4
Orr	12-50	18-25	0.2-0.6	0.15-0.17	6.1-7.3	<2	Moderate------	0.20		
	50-60	5-22	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low-----------	0.15		
630, 631----------	0-4	27-35	0.2-0.6	0.15-0.20	5.6-7.3	<2	Moderate------	0.28	2	7
Fleischmann	4-20	40-55	0.06-0.2	0.13-0.16	6.1-7.3	<2	High----------	0.24		
	20-43	---	---	---	---	---	--------------	----		
	43-60	---	---	---	---	---	--------------	----		
632---------------	0-4	10-20	0.2-0.6	0.15-0.18	6.1-7.3	<2	Moderate------	0.32	2	6
Fleischmann	4-20	40-55	0.06-0.2	0.13-0.16	6.1-7.3	<2	High----------	0.24		
	20-43	---	---	---	---	---	--------------	----		
	43-60	---	---	---	---	---	--------------	----		
640---------------	0-12	2-7	2.0-6.0	0.06-0.08	6.1-7.3	<2	Low-----------	0.20	5	3
Notus	12-60	3-10	2.0-6.0	0.03-0.06	6.1-7.3	<2	Low-----------	0.17		
650---------------	0-3	27-35	0.2-0.6	0.13-0.16	6.1-7.8	<2	Moderate------	0.17	1	7
Chalco	3-15	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High----------	0.24		
	15	---	---	---	---	---	--------------	----		
651---------------	0-4	27-35	0.2-0.6	0.13-0.16	6.1-7.8	<2	Moderate------	0.17	1	7
Chalco	4-15	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High----------	0.24		
	15	---	---	---	---	---	--------------	----		
652---------------	0-3	15-25	0.6-2.0	0.12-0.15	6.1-7.3	<2	Low-----------	0.28	1	5
Chalco	3-15	40-60	<0.06	0.12-0.15	6.1-8.4	<2	High----------	0.24		
	15-30	---	---	---	---	---	--------------	----		
653---------------	0-3	10-12	2.0-6.0	0.09-0.11	6.1-7.3	<2	Low-----------	0.24	1	5
Chalco	3-15	40-60	<0.06	0.12-0.15	6.1-8.4	<2	High----------	0.24		
	15-30	---	---	---	---	---	--------------	----		
654*:										
Chalco-----------	0-3	10-12	2.0-6.0	0.09-0.11	6.1-7.3	<2	Low-----------	0.24	1	5
	3-15	40-60	<0.06	0.12-0.15	6.1-8.4	<2	High----------	0.24		
	15-30	---	---	---	---	---	--------------	----		
Celeton Variant-	0-6	15-24	6.0-20	0.11-0.13	7.9-8.4	<4	Moderate------	0.32	1	5
	6	---	---	---	---	---	--------------	----		
660---------------	0-13	8-18	2.0-6.0	0.07-0.10	6.1-7.3	<2	Low-----------	0.17	5	4
Oest	13-44	18-25	0.6-2.0	0.07-0.10	6.1-7.3	<2	Low-----------	0.17		
	44-60	5-12	6.0-20.0	0.05-0.08	6.1-7.3	<2	Low-----------	0.10		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
661----------------- Oest	0-14	8-18	2.0-6.0	0.07-0.10	6.1-7.3	<2	Low------------	0.17	5	4
	14-40	18-25	0.6-2.0	0.07-0.10	6.1-7.3	<2	Low------------	0.17		
	40-60	5-12	6.0-20.0	0.05-0.08	6.1-7.3	<2	Low------------	0.10		
662----------------- Oest	0-8	8-18	2.0-6.0	0.07-0.10	6.1-7.3	<2	Low------------	0.17	5	5
	8-40	18-25	0.6-2.0	0.07-0.10	6.1-7.3	<2	Low------------	0.17		
	40-60	5-12	6.0-20.0	0.05-0.08	6.1-7.3	<2	Low------------	0.10		
663----------------- Oest	0-15	10-22	0.6-2.0	0.08-0.11	6.1-7.3	<2	Low------------	0.24	5	6
	15-40	18-25	0.6-2.0	0.05-0.09	6.1-7.3	<2	Low------------	0.20		
	40-60	3-8	6.0-20	0.04-0.06	6.1-7.3	<2	Low------------	0.20		
664----------------- Oest	0-14	10-22	0.6-2.0	0.08-0.11	6.1-7.3	<2	Low------------	0.24	5	6
	14-40	18-25	0.6-2.0	0.05-0.09	6.1-7.3	<2	Low------------	0.20		
	40-60	3-8	6.0-20	0.04-0.06	6.1-7.3	<2	Low------------	0.20		
668----------------- Oest	0-15	8-18	2.0-6.0	0.07-0.10	6.1-7.3	<2	Low------------	0.17	5	5
	15-40	18-25	0.6-2.0	0.07-0.10	6.1-7.3	<2	Low------------	0.17		
	40-60	5-12	6.0-20.0	0.05-0.08	6.1-7.3	<2	Low------------	0.10		
669----------------- Oest	0-14	10-18	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low------------	0.17	5	4
	14-40	18-25	0.6-2.0	0.05-0.09	6.1-7.3	<2	Low------------	0.20		
	40-60	3-8	6.0-20	0.04-0.06	6.1-7.3	<2	Low------------	0.20		
670----------------- Galeppi	0-10	5-15	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low------------	0.24	5	3
	10-22	22-30	0.2-0.6	0.16-0.18	6.6-7.8	<2	Moderate------	0.24		
	22-60	5-15	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low------------	0.28		
671----------------- Galeppi	0-10	5-15	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low------------	0.24	5	3
	10-24	22-30	0.2-0.6	0.16-0.18	6.6-7.8	<2	Moderate------	0.24		
	24-60	5-15	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low------------	0.28		
673----------------- Galeppi	0-10	5-15	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low------------	0.24	5	3
	10-21	22-30	0.2-0.6	0.16-0.18	6.6-7.8	<2	Moderate------	0.24		
	21-60	5-15	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low------------	0.28		
674----------------- Galeppi	0-10	5-15	2.0-6.0	0.08-0.11	6.1-7.3	<2	Low------------	0.15	5	4
	10-21	22-30	0.2-0.6	0.09-0.13	6.6-7.8	<2	Moderate------	0.20		
	21-60	5-15	0.6-2.0	0.07-0.09	6.6-7.8	<2	Low------------	0.24		
676*:										
Galeppi-----------	0-9	5-15	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low------------	0.24	5	4
	9-36	22-30	0.2-0.6	0.16-0.18	6.6-7.8	<2	Moderate------	0.24		
	36-60	5-15	0.6-2.0	0.08-0.10	6.6-7.8	<2	Low------------	0.28		
Barnard-----------	0-15	5-15	0.6-2.0	0.16-0.19	6.1-7.3	<2	Low------------	0.20	1	4
	15-26	40-50	0.06-0.2	0.13-0.16	6.1-7.3	<2	High-----------	0.28		
	26	---	---	---	---	---	---------------	----		
681----------------- Reno	0-2	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low------------	0.17	2	4
	2-24	35-60	<0.06	0.12-0.16	6.1-7.3	<2	High-----------	0.24		
	24-47	---	---	---	---	---	---------------	----		
	47	---	---	---	---	---	---------------	----		
683----------------- Reno	0-4	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low------------	0.17	2	4
	4-24	35-60	<0.06	0.12-0.16	6.1-7.3	<2	High-----------	0.24		
	24-47	---	---	---	---	---	---------------	----		
	47	---	---	---	---	---	---------------	----		
730----------------- Stodick	0-4	10-20	0.2-2.0	0.13-0.17	6.1-7.3	<2	Low------------	0.32	2	7
	4-14	25-35	0.2-0.6	0.13-0.17	6.1-7.3	<2	Moderate------	0.32		
	14	---	---	---	---	---	---------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
731----------------- Stodick	0-5	10-20	0.2-2.0	0.14-0.18	6.1-7.3	<2	Low-----------	0.32	2	7
	5-14	25-35	0.2-0.6	0.13-0.17	6.1-7.3	<2	Moderate------	0.32		
	14	---	---	---	---	---	--------------	----		
740----------------- Blackwell	0-11	5-15	0.6-2.0	0.13-0.16	6.1-7.3	<2	Low-----------	0.24	5	---
	11-60	20-30	0.2-0.6	0.12-0.14	6.1-7.3	<2	Moderate------	0.28		
752*, 753*:										
Toiyabe----------	0-8	2-4	6.0-20	0.06-0.08	5.6-7.3	<2	Low-----------	0.10	1	3
	8-13	2-4	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10		
	13	---	---	---	---	---	--------------	----		
Corbett----------	0-8	0-5	6.0-20	0.03-0.05	5.6-6.5	<2	Low-----------	0.15	2	8
	8-32	0-5	6.0-20	0.03-0.06	5.6-6.5	<2	Low-----------	0.15		
	32	---	---	---	---	---	--------------	----		
Rock outcrop.										
754*:										
Toiyabe----------	0-9	2-4	6.0-20	0.06-0.08	5.6-7.3	<2	Low-----------	0.10	1	3
	9-13	2-4	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10		
	13	---	---	---	---	---	--------------	----		
Rock outcrop.										
756*:										
Toiyabe----------	0-7	2-4	6.0-20	0.06-0.08	5.6-7.3	<2	Low-----------	0.10	1	3
	7-15	2-4	6.0-20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10		
	15	---	---	---	---	---	--------------	----		
Corbett----------	0-9	0-5	6.0-20	0.03-0.05	5.6-6.5	<2	Low-----------	0.15	2	8
	9-34	0-5	6.0-20	0.03-0.06	5.6-6.5	<2	Low-----------	0.15		
	34	---	---	---	---	---	--------------	----		
Haypress---------	0-15	3-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low-----------	0.10	3	---
	15-46	0-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low-----------	0.10		
	46	---	---	---	---	---	--------------	----		
772----------------- Booford	0-7	8-15	0.6-2.0	0.10-0.13	6.1-7.3	<2	Low-----------	0.20	2	5
	7-25	45-60	0.06-0.2	0.13-0.17	6.1-7.3	<2	High----------	0.20		
	25-45	---	---	---	---	---	--------------	----		
775----------------- Booford	0-8	10-20	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low-----------	0.37	2	6
	8-25	45-60	0.06-0.2	0.13-0.17	6.1-7.3	<2	High----------	0.20		
	25-45	---	---	---	---	---	--------------	----		
780----------------- Bieber	0-8	5-18	0.6-2.0	0.11-0.14	6.1-7.3	<2	Low-----------	0.17	1	8
	8-19	35-45	<0.06	0.14-0.16	6.1-8.4	<2	High----------	0.24		
	19-25	---	---	---	---	---	--------------	----		
	25-60	---	---	---	---	---	--------------	----		
782----------------- Bieber	0-7	5-18	0.6-2.0	0.11-0.14	6.1-7.3	<2	Low-----------	0.17	1	8
	7-19	35-45	<0.06	0.14-0.16	6.1-8.4	<2	High----------	0.24		
	19-25	---	---	---	---	---	--------------	----		
	25-60	5-15	0.06-0.2	0.03-0.08	7.4-8.4	<2	Low-----------	0.10		
800----------------- Truckee	0-12	10-20	0.6-2.0	0.14-0.16	7.9-8.4	2-4	Low-----------	0.43	5	6
	12-60	18-25	0.2-0.6	0.15-0.18	7.9-8.4	2-4	Moderate------	0.24		
802----------------- Truckee	0-12	10-20	0.6-2.0	0.14-0.16	>8.4	>16	Low-----------	0.43	5	6
	12-60	18-25	0.2-0.6	0.15-0.18	>7.8	>8	Moderate------	0.24		
805----------------- Truckee	0-12	5-12	2.0-6.0	0.10-0.12	7.4-9.0	8-16	Low-----------	0.20	5	4
	12-30	18-25	0.2-0.6	0.13-0.16	7.4-9.0	4-16	Moderate------	0.20		
	30-60	3-10	6.0-20.0	0.08-0.10	7.4-8.4	2-4	Low-----------	0.10		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
806---------------- Truckee	0-12	5-12	2.0-6.0	0.10-0.12	>8.4	>16	Low-----------	0.20	5	4
	12-30	18-25	0.2-0.6	0.14-0.17	>8.4	>8	Moderate------	0.24		
	30-60	3-10	6.0-20.0	0.08-0.12	>7.8	4-16	Low-----------	0.24		
810---------------- Rose Creek	0-16	10-15	0.6-6.0	0.10-0.13	7.4-8.4	<4	Low-----------	0.32	5	4
	16-60	10-18	2.0-6.0	0.10-0.13	7.9-9.0	2-4	Low-----------	0.28		
812---------------- Rose Creek	0-15	5-10	6.0-20	0.09-0.12	7.4-8.4	<2	Low-----------	0.20	5	2
	15-60	10-18	2.0-6.0	0.10-0.13	7.9-9.0	2-4	Low-----------	0.28		
813---------------- Rose Creek	0-16	5-15	2.0-6.0	0.10-0.13	7.4-8.4	<4	Low-----------	0.24	5	4
	16-60	10-18	2.0-6.0	0.10-0.13	7.9-9.0	2-4	Low-----------	0.28		
820---------------- Marla	0-18	2-8	2.0-6.0	0.06-0.08	5.1-7.3	<2	Low-----------	0.15	5	8
	18-44	3-8	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low-----------	0.15		
	44-66	5-15	0.2-0.6	0.06-0.11	6.1-7.3	<2	Low-----------	0.24		
821---------------- Marla	0-18	2-8	2.0-6.0	0.06-0.08	5.1-7.3	<2	Low-----------	0.15	5	8
	18-44	3-8	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low-----------	0.15		
	44-66	5-15	0.2-0.6	0.06-0.11	6.1-7.3	<2	Low-----------	0.24		
830---------------- Fettic	0-1	27-30	0.06-0.2	0.14-0.17	>7.8	>8	Moderate------	0.49	5	5
	1-21	27-35	<0.06	0.14-0.16	>7.8	>8	Moderate------	0.32		
	21-60	15-30	0.06-0.2	0.14-0.16	>7.8	>8	Moderate------	0.37		
831---------------- Fettic	0-4	20-27	0.2-0.6	0.14-0.17	>7.8	4-8	Moderate------	0.28	5	4
	4-20	27-35	<0.06	0.14-0.16	>7.8	4-16	Moderate------	0.32		
	20-60	15-30	0.06-0.2	0.14-0.16	>7.8	>8	Moderate------	0.37		
840*:										
Temo-------------	0-10	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.15	1	5
	10-16	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.17		
	16	---	---	---	---	---	--------------	----		
Witefels---------	0-8	0-5	6.0-20	0.04-0.06	5.1-6.5	<2	Low-----------	0.10	2	3
	8-35	3-10	6.0-20	0.05-0.07	5.1-6.5	<2	Low-----------	0.10		
	35	---	---	---	---	---	--------------	----		
Rock outcrop.										
850---------------- Washoe	0-8	5-15	0.6-2.0	0.07-0.10	6.1-7.3	<2	Low-----------	0.15	5	4
	8-38	18-27	0.2-0.6	0.10-0.14	6.1-7.3	<2	Moderate------	0.20		
	38-60	5-10	>20	0.04-0.06	6.1-7.3	<2	Low-----------	0.10		
861---------------- Reywat	0-6	10-18	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low-----------	0.28	1	8
	6-18	24-35	0.2-0.6	0.14-0.16	7.4-8.4	<2	Moderate------	0.15		
	18	---	---	---	---	---	--------------	----		
862---------------- Reywat	0-6	8-15	0.6-2.0	0.07-0.09	6.6-7.8	<2	Low-----------	0.15	1	8
	6-18	24-35	0.2-0.6	0.14-0.16	7.4-8.4	<2	Moderate------	0.15		
	18	---	---	---	---	---	--------------	----		
863*:										
Reywat-----------	0-6	10-18	0.6-2.0	0.12-0.14	6.1-7.8	<2	Low-----------	0.28	1	8
	6-14	24-35	0.2-0.6	0.14-0.16	6.6-8.4	<2	Moderate------	0.15		
	14	---	---	---	---	---	--------------	----		
Rock outcrop.										
870*:										
Xman-------------	0-3	12-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low-----------	0.28	1	5
	3-14	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	14-29	---	---	---	---	---	--------------	----		
	29	---	---	---	---	---	--------------	----		
Rock outcrop.										

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
871, 872---------- Xman	0-2	12-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low----------	0.32	1	5
	2-14	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High---------	0.24		
	14-29	---	---	---	---	---	-------------	----		
	29	---	---	---	---	---	-------------	----		
873*:										
Xman------------	0-4	12-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low----------	0.28	1	5
	4-14	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High---------	0.24		
	14-29	---	---	---	---	---	-------------	----		
	29	---	---	---	---	---	-------------	----		
Rock outcrop.										
875*:										
Xman------------	0-2	12-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low----------	0.32	1	5
	2-14	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High---------	0.24		
	14-29	---	---	---	---	---	-------------	----		
	29	---	---	---	---	---	-------------	----		
Zephan----------	0-8	10-15	0.6-2.0	0.12-0.15	5.6-6.5	<2	Low----------	0.15	2	4
	8-35	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High---------	0.10		
	35-42	---	---	---	---	---	-------------	----		
Mizel-----------	0-3	5-15	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low----------	0.17	1	5
	3-7	---	---	---	---	---	-------------	----		
876*:										
Xman------------	0-2	12-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low----------	0.32	1	5
	2-14	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High---------	0.24		
	14-29	---	---	---	---	---	-------------	----		
	29	---	---	---	---	---	-------------	----		
Oppio-----------	0-6	8-18	2.0-6.0	0.07-0.09	7.4-7.8	<2	Low----------	0.28	2	8
	6-27	40-50	0.06-0.2	0.14-0.16	7.4-7.8	<2	High---------	0.17		
	27	---	---	---	---	---	-------------	----		
Old Camp--------	0-2	5-15	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low----------	0.17	1	8
	2-14	25-35	0.2-0.6	0.08-0.11	6.6-8.6	<2	Moderate-----	0.15		
	14	---	---	---	---	---	-------------	----		
877*:										
Xman------------	0-2	12-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low----------	0.32	1	5
	2-14	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High---------	0.24		
	14-29	---	---	---	---	---	-------------	----		
	29	---	---	---	---	---	-------------	----		
Frodo-----------	0-6	15-27	0.6-2.0	0.03-0.11	6.1-7.3	<2	Moderate-----	0.20	1	8
	6-18	35-60	0.06-0.2	0.11-0.17	6.6-8.4	<2	High---------	0.17		
	18-23	---	---	---	---	---	-------------	----		
	23-30	---	---	---	---	---	-------------	----		
Mizel-----------	0-3	5-15	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low----------	0.17	1	5
	3-7	---	---	---	---	---	-------------	----		
880*:										
Zephan----------	0-8	10-15	0.6-2.0	0.12-0.15	5.6-6.5	<2	Low----------	0.15	2	4
	8-35	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High---------	0.10		
	35-42	---	---	---	---	---	-------------	----		
Rock outcrop.										
Smallcone-------	0-6	5-15	6.0-20	0.02-0.07	5.1-6.0	<2	Low----------	0.10	1	6
	6	---	---	---	---	---	-------------	----		
881-------------- Zephan	0-8	10-15	0.6-2.0	0.12-0.15	5.6-6.5	<2	Low----------	0.15	2	4
	8-35	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High---------	0.10		
	35-42	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
882------------------ Zephan	0-8	10-15	0.6-2.0	0.12-0.15	5.6-6.5	<2	Low----------	0.15	2	4
	8-35	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High---------	0.10		
	35-42	---	---	---	---	---	-------------	----		
890, 891---------- Indiano	0-14	8-20	0.6-2.0	0.12-0.16	6.1-7.3	<2	Low----------	0.32	3	6
	14-29	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	29	---	---	---	---	---	-------------	----		
892*:										
Indiano----------	0-13	8-20	0.6-2.0	0.12-0.16	6.1-7.3	<2	Low----------	0.32	3	6
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	33	---	---	---	---	---	-------------	----		
Koontz-----------	0-6	12-22	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low----------	0.24	2	8
	6-18	25-35	0.2-0.6	0.09-0.11	6.6-7.8	<2	Moderate-----	0.24		
	18	---	---	---	---	---	-------------	----		
Flex-------------	0-3	8-18	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low----------	0.17	1	5
	3-10	18-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low----------	0.17		
	10	---	---	---	---	---	-------------	----		
893*:										
Indiano----------	0-13	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low----------	0.32	3	4
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	33	---	---	---	---	---	-------------	----		
Duco-------------	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low----------	0.17	1	5
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate-----	0.24		
	19	---	---	---	---	---	-------------	----		
Cagle------------	0-7	30-35	0.2-0.6	0.16-0.17	6.6-7.3	<2	Moderate-----	0.28	3	8
	7-20	45-60	0.06-0.2	0.13-0.15	6.6-7.3	<2	High---------	0.24		
	20-23	30-55	0.06-0.2	0.07-0.09	6.6-7.3	<2	High---------	0.24		
	23	---	---	---	---	---	-------------	----		
894*:										
Indiano----------	0-13	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low----------	0.32	3	4
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	33	---	---	---	---	---	-------------	----		
Duco-------------	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low----------	0.17	1	5
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate-----	0.24		
	19	---	---	---	---	---	-------------	----		
Skedaddle--------	0-5	18-27	0.6-2.0	0.06-0.10	6.6-7.8	<2	Low----------	0.28	1	7
	5-8	---	---	---	---	---	-------------	----		
	8-20	---	---	---	---	---	-------------	----		
895*:										
Indiano----------	0-13	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low----------	0.32	3	4
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	33	---	---	---	---	---	-------------	----		
Zephan-----------	0-8	10-15	0.6-2.0	0.12-0.15	5.6-6.5	<2	Low----------	0.15	2	4
	8-35	35-45	0.06-0.2	0.10-0.13	5.6-6.5	<2	High---------	0.10		
	35-42	---	---	---	---	---	-------------	----		
Duco-------------	0-7	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low----------	0.17	1	5
	7-15	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate-----	0.24		
	15	---	---	---	---	---	-------------	----		
900-------------- Flex	0-3	8-18	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low----------	0.17	1	5
	3-10	18-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low----------	0.17		
	10	---	---	---	---	---	-------------	----		
901-------------- Flex	0-4	8-18	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low----------	0.17	1	5
	4-10	18-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low----------	0.17		
	10	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
903--------------- Flex	0-3	8-18	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low-----------	0.20	1	4
	3-10	18-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low-----------	0.17		
	10	---	---	---	---	---	--------------	----		
910--------------- Vamp	0-3	12-18	2.0-6.0	0.11-0.13	>7.8	4-8	Low-----------	0.32	5	3
	3-36	12-18	0.6-2.0	0.13-0.16	>7.8	4-8	Low-----------	0.32		
	36-42	---	---	---	---	---	--------------	----		
	42-60	10-18	0.6-6.0	0.08-0.16	>7.8	2-8	Low-----------	0.32		
911--------------- Vamp	0-3	12-18	0.6-2.0	0.13-0.16	>7.8	>16	Low-----------	0.49	5	6
	3-36	12-18	0.6-2.0	0.13-0.16	>7.8	4-8	Low-----------	0.32		
	36-42	---	---	---	---	---	--------------	----		
	42-60	10-18	0.6-6.0	0.08-0.16	>7.8	2-8	Low-----------	0.32		
930--------------- Old Camp	0-7	5-15	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low-----------	0.17	1	8
	7-17	25-35	0.2-0.6	0.08-0.11	6.6-8.6	<2	Moderate------	0.15		
	17	---	---	---	---	---	--------------	----		
931*:										
Old Camp--------- extremely stony	0-7	5-15	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low-----------	0.17	1	8
	7-17	25-35	0.2-0.6	0.08-0.11	6.6-8.6	<2	Moderate------	0.15		
	17	---	---	---	---	---	--------------	----		
Old Camp--------- stony	0-8	5-15	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low-----------	0.17	1	8
	8-17	25-35	0.2-0.6	0.08-0.11	6.6-8.6	<2	Moderate------	0.15		
	17	---	---	---	---	---	--------------	----		
Rock outcrop.										
932--------------- Old Camp	0-7	5-15	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low-----------	0.17	1	8
	7-17	25-35	0.2-0.6	0.08-0.11	6.6-8.6	<2	Moderate------	0.15		
	17	---	---	---	---	---	--------------	----		
960, 961---------- Kayo	0-11	5-12	2.0-6.0	0.05-0.09	6.1-7.3	<2	Low-----------	0.17	5	4
	11-22	13-18	2.0-6.0	0.05-0.08	6.1-7.3	<2	Low-----------	0.17		
	22-60	2-10	6.0-20	0.04-0.07	6.6-8.4	<2	Low-----------	0.10		
962--------------- Kayo	0-10	5-12	2.0-6.0	0.05-0.09	6.1-7.3	<2	Low-----------	0.15	5	5
	10-25	13-18	2.0-6.0	0.05-0.08	6.1-7.3	<2	Low-----------	0.17		
	25-60	2-10	6.0-20	0.04-0.07	6.6-8.4	<2	Low-----------	0.10		
963--------------- Kayo	0-11	5-12	2.0-6.0	0.05-0.09	6.1-7.3	<2	Low-----------	0.15	5	5
	11-22	13-18	2.0-6.0	0.05-0.08	6.1-7.3	<2	Low-----------	0.17		
	22-60	2-10	6.0-20	0.04-0.07	6.6-8.4	<2	Low-----------	0.10		
971--------------- Aladshi	0-7	5-15	0.6-2.0	0.09-0.13	6.1-7.3	<2	Low-----------	0.28	5	3
	7-34	18-27	0.2-0.6	0.13-0.18	6.6-8.4	<2	Moderate------	0.28		
	34-60	8-18	2.0-6.0	0.05-0.12	7.9-8.4	<2	Low-----------	0.24		
974--------------- Aladshi	0-6	5-15	0.6-2.0	0.07-0.09	6.1-7.3	<2	Low-----------	0.24	5	4
	6-34	18-27	0.2-0.6	0.13-0.18	6.6-8.4	<2	Moderate------	0.28		
	34-60	8-18	2.0-6.0	0.05-0.12	7.9-8.4	<2	Low-----------	0.24		
980--------------- Koontz	0-5	12-22	0.6-2.0	0.08-0.09	5.6-7.8	<2	Low-----------	0.32	2	6
	5-18	25-35	0.2-0.6	0.09-0.11	6.6-7.8	<2	Moderate------	0.24		
	18	---	---	---	---	---	--------------	----		
982--------------- Koontz	0-6	12-22	0.6-2.0	0.10-0.12	6.6-7.8	<2	Low-----------	0.28	2	8
	6-18	25-35	0.2-0.6	0.09-0.11	6.6-7.8	<2	Moderate------	0.24		
	18	---	---	---	---	---	--------------	----		
990*. Rock outcrop										
991*:										
Xeric Torriorthents.										
Urban land.										

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
992*. Playas										
993*. Haplaquolls										
994*: Badland.										
Chalco----------	0-3	27-35	0.2-0.6	0.13-0.16	6.1-7.8	<2	Moderate-----	0.17	1	7
	3-15	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High---------	0.24		
	15	---	---	---	---	---	-------------	----		
Verdico---------	0-2	8-18	2.0-6.0	0.08-0.13	6.1-7.3	<2	Low----------	0.28	2	6
	2-22	45-60	<0.06	0.13-0.18	6.1-7.3	<2	High---------	0.28		
	22-29	45-60	<0.06	0.13-0.18	6.6-7.8	<2	High---------	0.24		
	29-60	---	---	---	---	---	-------------	----		
996*: Dune land.										
Playas.										
997*. Badland										
998*. Beaches										
1010------------- Gabica	0-14	5-15	2.0-6.0	0.06-0.09	5.6-7.3	<2	Low----------	0.17	1	8
	14-19	24-35	0.2-0.6	0.05-0.09	5.6-7.3	<2	Low----------	0.15		
	19	---	---	---	---	---	-------------	----		
1040------------- Orr Variant	0-18	5-15	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low----------	0.17	5	4
	18-39	20-35	0.2-0.6	0.14-0.18	6.6-8.4	<4	Moderate-----	0.32		
	39-65	20-35	0.2-0.6	0.16-0.18	7.4-8.4	<4	Moderate-----	0.43		
1041------------- Orr Variant	0-10	5-15	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low----------	0.20	5	3
	10-31	20-35	0.2-0.6	0.14-0.18	6.6-8.4	<4	Moderate-----	0.32		
	31-60	20-35	0.2-0.6	0.16-0.18	7.4-8.4	<4	Moderate-----	0.43		
1050------------- Waspo	0-7	45-60	<0.06	0.15-0.18	6.1-7.3	<2	High---------	0.32	3	4
	7-24	45-60	<0.06	0.15-0.18	6.1-7.8	<2	High---------	0.28		
	24-35	---	---	---	---	---	-------------	----		
1051------------- Waspo	0-7	45-60	<0.06	0.15-0.18	6.1-7.3	<2	High---------	0.28	3	5
	7-24	45-60	<0.06	0.15-0.18	6.1-7.8	<2	High---------	0.28		
	24-35	---	---	---	---	---	-------------	----		
1052*: Waspo-----------	0-9	45-60	<0.06	0.15-0.18	6.1-7.3	<2	High---------	0.28	3	5
	9-26	45-60	<0.06	0.15-0.18	6.1-7.8	<2	High---------	0.28		
	26-35	---	---	---	---	---	-------------	----		
Rock outcrop.										
1054------------- Waspo	0-6	45-60	<0.06	0.15-0.18	6.1-7.3	<2	High---------	0.32	3	5
	6-23	45-60	<0.06	0.15-0.18	6.1-7.8	<2	High---------	0.28		
	23-35	---	---	---	---	---	-------------	----		
1060*, 1062*: Witefels---------	0-8	0-5	6.0-20	0.04-0.06	5.1-6.5	<2	Low----------	0.10	2	3
	8-35	3-10	6.0-20	0.05-0.07	5.1-6.5	<2	Low----------	0.10		
	35	---	---	---	---	---	-------------	----		
Rock outcrop.										

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1080---------------	0-8	8-15	0.6-2.0	0.07-0.09	5.6-6.5	<2	Low-----------	0.20	5	4
Inville Variant	8-25	15-25	0.2-0.6	0.10-0.12	5.6-6.5	<2	Moderate------	0.20		
	25-78	18-30	0.2-0.6	0.11-0.14	5.6-6.5	<2	Moderate------	0.24		
1090, 1091--------	0-6	2-5	6.0-20	0.05-0.06	5.6-6.5	<2	Low-----------	0.10	5	6
Railcity	6-60	2-8	6.0-20	0.05-0.08	5.6-6.5	<2	Low-----------	0.15		
1100*:										
Graylock---------	0-10	1-5	6.0-20	0.06-0.09	4.5-6.0	<2	Low-----------	0.10	4	8
	10-60	0-5	6.0-20	0.03-0.08	4.5-5.0	<2	Low-----------	0.10		
	60	---	---	---	---	---	-------------	----		
Temo-------------	0-10	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.15	1	5
	10-16	2-8	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----------	0.17		
	16	---	---	---	---	---	-------------	----		
Rock outcrop.										
1120--------------	0-10	2-10	6.0-20	0.04-0.06	5.6-7.3	<2	Low-----------	0.10	5	4
Apmat	10-21	5-12	6.0-20	0.04-0.06	5.6-7.3	<2	Low-----------	0.15		
	21-55	10-18	2.0-6.0	0.05-0.07	5.6-7.3	<2	Low-----------	0.17		
	55-60	5-12	6.0-20	0.02-0.04	5.6-7.3	<2	Low-----------	0.10		
1121--------------	0-10	5-10	2.0-6.0	0.08-0.10	5.6-7.3	<2	Low-----------	0.20	5	4
Apmat	10-21	5-12	6.0-20	0.04-0.06	5.6-7.3	<2	Low-----------	0.15		
	21-55	10-18	2.0-6.0	0.05-0.07	5.6-7.3	<2	Low-----------	0.17		
	55-60	5-12	6.0-20	0.02-0.04	5.6-7.3	<2	Low-----------	0.10		
1130--------------	0-15	8-18	2.0-6.0	0.12-0.14	6.6-7.8	<2	Low-----------	0.24	5	4
Dithod	15-60	18-27	0.2-0.6	0.15-0.17	6.6-8.4	<2	Moderate------	0.32		
1141, 1142--------	0-15	4-10	6.0-20.0	0.08-0.09	6.1-7.3	<2	Low-----------	0.10	5	2
Bedell	15-54	12-18	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low-----------	0.17		
	54-65	3-14	6.0-20.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10		
1143--------------	0-14	4-10	6.0-20.0	0.08-0.09	6.1-7.3	<2	Low-----------	0.10	5	2
Bedell	14-50	12-18	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low-----------	0.17		
	50-60	3-14	6.0-20.0	0.06-0.10	6.1-7.3	<2	Low-----------	0.10		
1160--------------	0-2	27-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate------	0.43	5	7
Jowec	2-20	40-50	0.06-0.2	0.16-0.19	6.1-7.3	<2	High----------	0.37		
	20-38	30-40	0.06-0.2	0.15-0.18	6.1-7.3	<2	High----------	0.32		
	38-60	15-20	0.6-2.0	0.12-0.14	7.4-9.0	<2	Low-----------	0.32		
1161--------------	0-2	12-18	2.0-6.0	0.10-0.13	6.1-7.3	<2	Low-----------	0.28	5	3
Jowec	2-20	40-50	0.06-0.2	0.16-0.19	6.1-7.3	<2	High----------	0.37		
	20-38	30-40	0.06-0.2	0.15-0.18	6.1-7.3	<2	High----------	0.32		
	38-60	15-20	0.6-2.0	0.12-0.14	7.4-9.0	<2	Low-----------	0.32		
1170--------------	0-6	8-15	2.0-6.0	0.08-0.13	6.1-7.3	<2	Low-----------	0.17	5	3
Wedertz	6-22	20-30	0.2-0.6	0.17-0.19	6.1-7.3	<2	Moderate------	0.24		
	22-34	10-18	0.2-0.6	0.08-0.13	6.1-7.3	<2	Low-----------	0.17		
	34-60	4-10	6.0-20	0.05-0.09	6.1-7.3	<2	Low-----------	0.10		
1171--------------	0-8	8-15	2.0-6.0	0.08-0.13	6.1-7.3	<2	Low-----------	0.17	5	3
Wedertz	8-31	20-30	0.2-0.6	0.17-0.19	6.1-7.3	<2	Moderate------	0.24		
	31-38	10-18	0.2-0.6	0.08-0.13	6.1-7.3	<2	Low-----------	0.17		
	38-60	4-10	6.0-20	0.05-0.09	6.1-7.3	<2	Low-----------	0.10		
1172--------------	0-7	2-8	>20	0.06-0.08	6.1-7.3	<2	Low-----------	0.10	5	1
Wedertz	7-25	20-30	0.2-0.6	0.17-0.19	6.1-7.3	<2	Moderate------	0.24		
	25-31	10-18	0.2-0.6	0.08-0.13	6.1-7.3	<2	Low-----------	0.17		
	31-60	4-10	6.0-20	0.05-0.09	6.1-7.3	<2	Low-----------	0.10		
1181*:										
Haypress---------	0-15	3-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low-----------	0.10	3	---
	15-46	0-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low-----------	0.10		
	46	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1181*:										
Tanob-----------	0-17	5-12	6.0-20.0	0.05-0.07	5.1-6.5	<2	Low-----------	0.10	3	3
	17-28	8-18	0.6-2.0	0.07-0.09	5.6-6.5	<2	Low-----------	0.17		
	28	---	---	---	---	---	-------------	----		
Rock outcrop.										
1182*:										
Haypress---------	0-15	3-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low-----------	0.10	3	---
	15-40	0-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low-----------	0.10		
	40	---	---	---	---	---	-------------	----		
Tanob-----------	0-17	5-12	6.0-20.0	0.05-0.07	5.1-6.5	<2	Low-----------	0.10	3	3
	17-28	8-18	0.6-2.0	0.07-0.09	5.6-6.5	<2	Low-----------	0.17		
	28	---	---	---	---	---	-------------	----		
Rock outcrop.										
1183*:										
Haypress---------	0-14	3-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low-----------	0.10	3	---
	14-49	0-8	6.0-20	0.04-0.07	5.6-6.5	<2	Low-----------	0.10		
	49	---	---	---	---	---	-------------	----		
Rock outcrop.										
1190, 1191-------- Spasprey	0-2	3-12	2.0-20.0	0.06-0.11	6.6-7.3	<2	Low-----------	0.15	3	2
	2-12	20-35	0.2-0.6	0.15-0.18	6.6-7.8	<2	Moderate-----	0.24		
	12-29	5-12	0.6-2.0	0.07-0.10	7.9-8.4	<4	Low-----------	0.15		
	29-46	---	---	---	---	---	-------------	----		
	46-60	5-12	2.0-6.0	0.06-0.11	7.9-8.4	<4	Low-----------	0.15		
1192-------------- Spasprey	0-6	3-12	2.0-20.0	0.06-0.11	6.6-7.3	<2	Low-----------	0.15	3	2
	6-14	20-35	0.2-0.6	0.15-0.18	6.6-7.8	<2	Moderate-----	0.24		
	14-30	5-12	0.6-2.0	0.07-0.10	7.9-8.4	<4	Low-----------	0.15		
	30-47	---	---	---	---	---	-------------	----		
	47-60	5-12	2.0-6.0	0.06-0.11	7.9-8.4	<4	Low-----------	0.15		
1193-------------- Spasprey	0-2	3-12	2.0-20.0	0.06-0.11	6.6-7.3	<2	Low-----------	0.15	3	2
	2-12	20-35	0.2-0.6	0.15-0.18	6.6-7.8	<2	Moderate-----	0.24		
	12-29	5-12	0.6-2.0	0.07-0.10	7.9-8.4	<4	Low-----------	0.15		
	29-46	---	---	---	---	---	-------------	----		
	46-60	5-12	2.0-6.0	0.06-0.11	7.9-8.4	<4	Low-----------	0.15		
1194-------------- Spasprey	0-3	10-15	2.0-6.0	0.10-0.14	6.6-7.3	<2	Low-----------	0.20	3	5
	3-14	20-35	0.2-0.6	0.15-0.18	6.6-7.8	<2	Moderate-----	0.24		
	14-23	5-12	0.6-2.0	0.07-0.10	7.9-8.4	<4	Low-----------	0.15		
	23-40	---	---	---	---	---	-------------	----		
	40-60	5-12	2.0-6.0	0.06-0.11	7.9-8.4	<4	Low-----------	0.15		
1200-------------- Mellor	0-11	12-20	0.6-2.0	0.12-0.15	7.9-9.0	8-16	Low-----------	0.55	5	6
	11-26	27-35	0.06-0.2	0.15-0.18	>8.4	>16	Moderate-----	0.43		
	26-60	20-30	0.06-0.2	0.14-0.16	>7.8	>16	Moderate-----	0.43		
1210, 1211-------- Linhart	0-14	2-5	6.0-20	0.05-0.08	6.1-7.3	<2	Low-----------	0.10	5	3
	14-60	2-8	6.0-20	0.02-0.05	6.1-7.3	<2	Low-----------	0.10		
1220-------------- Calpine	0-19	5-15	2.0-6.0	0.09-0.12	5.6-6.5	<2	Low-----------	0.17	5	3
	19-45	5-15	2.0-6.0	0.10-0.13	5.6-6.5	<2	Low-----------	0.20		
	45-65	4-10	6.0-20	0.05-0.09	6.1-7.3	<2	Low-----------	0.20		
1240-------------- Pizene	0-6	5-10	2.0-6.0	0.10-0.12	>7.8	<2	Low-----------	0.28	5	3
	6-21	18-25	0.2-0.6	0.12-0.15	>8.4	2-8	Moderate-----	0.24		
	21-60	5-10	2.0-6.0	0.13-0.16	7.9-9.0	<2	Low-----------	0.32		
1250-------------- Rednik	0-6	5-15	2.0-6.0	0.05-0.06	7.4-9.0	<2	Low-----------	0.20	5	5
	6-20	18-27	0.2-0.6	0.03-0.07	7.4-9.0	4-8	Low-----------	0.20		
	20-65	0-15	>20	0.03-0.05	>8.4	2-8	Low-----------	0.15		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1251------------- Rednik	0-6	5-15	2.0-6.0	0.05-0.06	7.4-9.0	<2	Low----------	0.20	5	6
	6-20	18-27	0.2-0.6	0.03-0.07	7.4-9.0	4-8	Low----------	0.20		
	20-65	0-15	>20	0.03-0.05	>8.4	2-8	Low----------	0.15		
1260*:										
Thulepah--------	0-6	10-20	2.0-6.0	0.13-0.15	6.1-7.3	<2	Low----------	0.28	5	7
	6-28	27-35	0.2-0.6	0.14-0.17	6.1-7.3	<2	Moderate-----	0.24		
	28-60	27-40	0.06-0.2	0.15-0.18	6.1-7.3	<2	Moderate-----	0.24		
Mosquet---------	0-5	10-20	2.0-6.0	0.11-0.13	6.6-7.3	<2	Low----------	0.20	1	5
	5-14	35-50	0.06-0.2	0.13-0.15	6.1-7.3	<2	High---------	0.15		
	14	---	---	---	---	---	-------------	----		
1270*:										
Tristan---------	0-7	10-20	0.6-2.0	0.07-0.08	6.6-7.8	<2	Low----------	0.28	3	8
	7-28	18-35	0.2-0.6	0.06-0.10	6.6-7.8	<2	Moderate-----	0.24		
	28-49	18-27	0.2-0.6	0.04-0.06	6.6-7.8	<2	Moderate-----	0.10		
	49	---	---	---	---	---	-------------	----		
Indiano---------	0-13	8-20	0.6-2.0	0.12-0.16	6.1-7.3	<2	Low----------	0.32	3	6
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	33	---	---	---	---	---	-------------	----		
Lemm------------	0-19	5-15	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low----------	0.17	5	6
	19-40	10-18	2.0-6.0	0.08-0.10	5.6-7.3	<2	Low----------	0.20		
	40-60	3-8	6.0-20	0.06-0.08	5.6-7.3	<2	Low----------	0.10		
1271*:										
Tristan---------	0-7	10-20	0.6-2.0	0.07-0.08	6.6-7.8	<2	Low----------	0.28	3	8
	7-28	18-35	0.2-0.6	0.06-0.10	6.6-7.8	<2	Moderate-----	0.24		
	28-49	18-27	0.2-0.6	0.04-0.06	6.6-7.8	<2	Moderate-----	0.10		
	49	---	---	---	---	---	-------------	----		
Barshaad--------	0-1	10-25	0.2-0.6	0.08-0.12	6.6-8.4	<2	Low----------	0.20	2	8
	1-24	40-60	<0.06	0.10-0.14	6.6-8.4	<2	High---------	0.20		
	24	---	---	---	---	---	-------------	----		
Arzo------------	0-2	20-27	0.2-0.6	0.06-0.13	6.6-8.4	<2	Moderate-----	0.24	2	8
	2-27	35-45	0.06-0.2	0.13-0.16	6.6-8.4	<2	High---------	0.28		
	27-35	15-27	0.2-0.6	0.06-0.16	6.6-8.4	<2	Moderate-----	0.32		
	35	---	---	---	---	---	-------------	----		
1272*:										
Tristan---------	0-7	10-20	0.6-2.0	0.07-0.08	6.6-7.8	<2	Low----------	0.28	3	8
	7-28	18-35	0.2-0.6	0.06-0.10	6.6-7.8	<2	Moderate-----	0.24		
	28-49	18-27	0.2-0.6	0.04-0.06	6.6-7.8	<2	Moderate-----	0.10		
	49	---	---	---	---	---	-------------	----		
Arzo------------	0-2	20-27	0.2-0.6	0.06-0.13	6.6-8.4	<2	Moderate-----	0.24	2	8
	2-27	35-45	0.06-0.2	0.13-0.16	6.6-8.4	<2	High---------	0.28		
	27-35	15-27	0.2-0.6	0.06-0.16	6.6-8.4	<2	Moderate-----	0.32		
	35	---	---	---	---	---	-------------	----		
Reywat----------	0-6	10-18	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low----------	0.28	1	8
	6-18	24-35	0.2-0.6	0.14-0.16	7.4-8.4	<2	Moderate-----	0.15		
	18	---	---	---	---	---	-------------	----		
1273*:										
Tristan---------	0-7	10-20	0.6-2.0	0.07-0.08	6.6-7.8	<2	Low----------	0.28	3	8
	7-28	18-35	0.2-0.6	0.06-0.10	6.6-7.8	<2	Moderate-----	0.24		
	28-49	18-27	0.2-0.6	0.04-0.06	6.6-7.8	<2	Moderate-----	0.10		
	49	---	---	---	---	---	-------------	----		
Barshaad--------	0-1	10-25	0.2-0.6	0.08-0.12	6.6-8.4	<2	Low----------	0.20	2	8
	1-24	40-60	<0.06	0.10-0.14	6.6-8.4	<2	High---------	0.20		
	24	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1273*:										
Frodo	0-6	15-27	0.6-2.0	0.03-0.11	6.1-7.3	<2	Moderate	0.20	1	8
	6-18	35-60	0.06-0.2	0.11-0.17	6.6-8.4	<2	High	0.17		
	18-23	---	---	---	---	---	---	----		
	23-30	---	---	---	---	---	---	----		
1290 Parran	0-5	32-40	<0.2	0.16-0.18	>7.8	>16	Moderate	0.37	5	7
	5-60	40-55	<0.06	0.14-0.16	>7.8	>16	High	0.37		
1300 Rose Creek Variant	0-5	10-15	0.6-2.0	0.10-0.13	7.9-9.0	<2	Low	0.24	5	3
	5-12	10-18	0.2-0.6	0.13-0.16	7.9-9.0	<2	Low	0.37		
	12-60	10-18	0.2-0.6	0.10-0.13	7.9-9.0	<2	Low	0.24		
1301 Rose Creek Variant	0-5	5-10	0.6-2.0	0.07-0.10	7.9-9.0	<2	Low	0.20	5	2
	5-12	10-18	0.2-0.6	0.13-0.16	7.9-9.0	<2	Low	0.37		
	12-60	10-18	0.2-0.6	0.10-0.13	7.9-9.0	<2	Low	0.24		
1310 Bango	0-2	5-10	2.0-6.0	0.09-0.12	7.9-9.0	4-8	Low	0.20	5	4
	2-10	20-30	0.2-0.6	0.15-0.18	7.9-9.0	4-8	Moderate	0.37		
	10-60	18-25	0.2-0.6	0.15-0.16	7.9-9.0	4-8	Moderate	0.43		
1320*:										
Osobb	0-2	12-18	2.0-6.0	0.05-0.07	7.4-9.0	<2	Low	0.17	1	8
	2-11	12-18	2.0-6.0	0.05-0.07	>7.8	2-4	Low	0.24		
	11-13	---	---	---	---	---	---	----		
	13	---	---	---	---	---	---	----		
Rezave	0-4	12-18	0.6-2.0	0.06-0.08	6.6-8.4	<2	Low	0.24	1	8
	4-13	35-55	0.06-0.2	0.12-0.15	7.9-9.0	2-4	High	0.37		
	13-19	35-45	0.2-0.6	0.09-0.12	>8.4	2-8	Moderate	0.37		
	19	---	---	---	---	---	---	----		
Fireball	0-3	10-18	2.0-6.0	0.07-0.09	7.9-9.0	<2	Low	0.24	3	8
	3-24	18-35	0.6-2.0	0.08-0.10	>8.4	<2	Moderate	0.28		
	24-47	10-18	2.0-6.0	0.04-0.06	>8.4	<2	Low	0.32		
	47	---	---	---	---	---	---	----		
1330*:										
Sutcliff	0-5	15-27	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low	0.28	3	8
	5-25	28-35	0.2-0.6	0.09-0.11	7.9-9.0	<2	Moderate	0.28		
	25-42	15-27	0.6-2.0	0.08-0.10	>8.4	<2	Low	0.37		
	42-53	---	---	---	---	---	---	----		
Kleinbush	0-5	1-7	6.0-20	0.03-0.06	7.4-8.4	<2	Low	0.17	5	8
	5-38	35-60	0.06-0.2	0.15-0.18	>7.8	2-8	Moderate	0.37		
	38-60	15-30	0.06-0.2	0.11-0.14	>7.8	8-16	Moderate	0.32		
Washoe	0-11	10-18	0.6-2.0	0.06-0.08	6.1-7.3	<2	Low	0.10	3	8
	11-42	18-27	0.2-0.6	0.07-0.10	6.1-7.3	<2	Moderate	0.17		
	42-60	3-10	>20	0.03-0.05	6.1-7.3	<2	Low	0.10		
1331*:										
Sutcliff	0-5	15-27	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low	0.28	3	8
	5-25	28-35	0.2-0.6	0.09-0.11	7.9-9.0	<2	Moderate	0.28		
	25-42	15-27	0.6-2.0	0.08-0.10	>8.4	<2	Low	0.37		
	42-53	---	---	---	---	---	---	----		
Bundorf	0-2	10-27	0.6-2.0	0.04-0.07	7.9-9.0	<2	Low	0.28	1	8
	2-10	35-50	0.06-0.2	0.16-0.18	7.9-9.0	<2	High	0.32		
	10-19	15-35	0.06-0.2	0.09-0.11	>8.4	<2	High	0.28		
	19-27	---	---	---	---	---	---	----		
Kleinbush	0-5	1-7	6.0-20	0.03-0.06	7.4-8.4	<2	Low	0.17	5	8
	5-38	35-60	0.06-0.2	0.15-0.18	>7.8	2-8	Moderate	0.37		
	38-60	15-30	0.06-0.2	0.11-0.14	>7.8	8-16	Moderate	0.32		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1340*:										
Hawsley----------	0-8	0-5	>20	0.06-0.08	6.6-8.4	<2	Low----------	0.10	5	1
	8-42	0-5	>20	0.06-0.08	7.4-9.0	<2	Low----------	0.10		
	42-60	0-5	>20	0.06-0.08	7.4-9.0	<2	Low----------	0.10		
Ruhe------------	0-6	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low----------	0.15	1	3
	6-14	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low----------	0.15		
	14-35	---	---	---	---	---	------------	----		
	35-60	0-5	6.0-20	0.01-0.03	>7.8	4-8	Low----------	0.15		
Bluewing---------	0-9	3-10	>6.0	0.04-0.05	7.4-9.0	<2	Low----------	0.15	5	4
	9-60	3-10	>20	0.04-0.06	7.4-9.0	<4	Low----------	0.10		
1341*:										
Isolde-----------	0-6	0-5	>20	0.06-0.09	6.6-8.4	<2	Low----------	0.28	5	1
	6-60	0-5	>20	0.06-0.09	6.6-8.4	<2	Low----------	0.24		
Dune land.										
1342*:										
Isolde-----------	0-6	0-5	>20	0.06-0.09	6.6-8.4	<2	Low----------	0.28	5	1
	6-60	0-5	>20	0.06-0.09	6.6-8.4	<2	Low----------	0.24		
Playas.										
1344*:										
Isolde-----------	0-6	0-5	>20	0.06-0.09	6.6-8.4	<2	Low----------	0.28	5	1
	6-60	0-5	>20	0.06-0.09	6.6-8.4	<2	Low----------	0.24		
Toulon-----------	0-6	10-12	2.0-6.0	0.06-0.10	7.9-9.0	2-4	Low----------	0.28	1	7
	6-13	12-15	2.0-6.0	0.06-0.08	7.9-9.0	2-4	Low----------	0.20		
	13-60	0-3	>20	0.03-0.06	7.9-9.0	2-4	Low----------	0.10		
1345-------------- Hawsley	0-8	0-5	>20	0.06-0.08	6.6-8.4	<2	Low----------	0.10	5	1
	8-42	0-5	>20	0.06-0.08	7.4-9.0	<2	Low----------	0.10		
	42-60	0-5	>20	0.06-0.08	7.4-9.0	<2	Low----------	0.10		
1350*:										
Stumble----------	0-2	3-10	6.0-20	0.06-0.08	7.4-8.4	<2	Low----------	0.17	5	2
	2-24	3-10	6.0-20	0.06-0.08	7.9-8.4	<4	Low----------	0.17		
	24-60	3-10	6.0-20	0.04-0.06	7.9-9.0	<8	Low----------	0.15		
Ruhe------------	0-6	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low----------	0.15	1	3
	6-14	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low----------	0.15		
	14-35	---	---	---	---	---	------------	----		
	35-60	0-5	6.0-20	0.01-0.03	>7.8	4-8	Low----------	0.15		
Bluewing---------	0-9	3-10	>6.0	0.04-0.05	7.4-9.0	<2	Low----------	0.15	5	4
	9-54	3-10	>20	0.04-0.06	7.4-9.0	<4	Low----------	0.10		
1351-------------- Stumble	0-6	3-10	6.0-20	0.06-0.08	7.4-8.4	<2	Low----------	0.17	5	2
	6-29	3-10	6.0-20	0.06-0.08	7.9-8.4	<4	Low----------	0.17		
	29-50	3-10	6.0-20	0.04-0.06	7.9-9.0	<8	Low----------	0.15		
1360*:										
Trocken----------	0-3	5-15	2.0-6.0	0.06-0.08	6.6-9.0	<2	Low----------	0.20	5	5
	3-60	8-18	0.6-2.0	0.05-0.08	>6.5	2-4	Low----------	0.17		
Stumble----------	0-2	3-10	6.0-20	0.06-0.08	7.4-8.4	<2	Low----------	0.17	5	2
	2-24	3-10	6.0-20	0.06-0.08	7.9-8.4	<4	Low----------	0.17		
	24-60	3-10	6.0-20	0.04-0.06	7.9-9.0	<8	Low----------	0.15		
Bluewing---------	0-9	3-10	>6.0	0.04-0.05	7.4-9.0	<2	Low----------	0.15	5	4
	9-54	3-10	>20	0.04-0.06	7.4-9.0	<4	Low----------	0.10		
1361*:										
Trocken----------	0-3	5-15	2.0-6.0	0.06-0.08	6.6-9.0	<2	Low----------	0.20	5	5
	3-60	8-18	0.6-2.0	0.05-0.08	>6.5	2-4	Low----------	0.17		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1361*:										
Ruhe-------------	0-6	0-5	6.0-20	0.03-0.07	7.9-9.0	2-4	Low-----------	0.15	1	4
	6-14	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low-----------	0.15		
	14-35	---	---	---	---	---	--------------	----		
	35-60	0-5	6.0-20	0.01-0.03	>7.8	4-8	Low-----------	0.15		
Bluewing---------	0-9	3-10	>6.0	0.04-0.05	7.4-9.0	<2	Low-----------	0.15	5	4
	9-54	3-10	>20	0.04-0.06	7.4-9.0	<4	Low-----------	0.10		
1362*:										
Trocken----------	0-3	5-15	2.0-6.0	0.06-0.08	6.6-9.0	<2	Low-----------	0.20	5	5
	3-60	8-18	0.6-2.0	0.05-0.08	>6.5	2-4	Low-----------	0.17		
Badland.										
1363-------------- Trocken	0-3	5-15	2.0-6.0	0.06-0.08	6.6-9.0	<2	Low-----------	0.20	5	5
	3-60	8-18	0.6-2.0	0.05-0.08	>6.5	2-4	Low-----------	0.17		
1364*:										
Trocken----------	0-3	5-15	2.0-6.0	0.06-0.08	6.6-9.0	<2	Low-----------	0.20	5	5
	3-60	8-18	0.6-2.0	0.05-0.08	>6.5	2-4	Low-----------	0.17		
Wrango-----------	0-8	0-8	>20	0.05-0.07	7.4-8.4	<2	Low-----------	0.17	1	4
	8-60	0-8	>20	0.03-0.05	7.4-8.4	<2	Low-----------	0.10		
1370*:										
Singatse---------	0-2	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24	1	6
	2-6	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24		
	6-12	---	---	---	---	---	--------------	----		
	12	---	---	---	---	---	--------------	----		
Fireball---------	0-3	10-18	2.0-6.0	0.07-0.09	7.9-9.0	<2	Low-----------	0.24	3	8
	3-24	18-35	0.6-2.0	0.08-0.10	>8.4	<2	Moderate------	0.28		
	24-47	10-18	2.0-6.0	0.04-0.06	>8.4	<2	Low-----------	0.32		
	47	---	---	---	---	---	--------------	----		
Rednik-----------	0-6	5-15	2.0-6.0	0.05-0.06	7.4-9.0	<2	Low-----------	0.20	5	6
	6-20	18-27	0.2-0.6	0.03-0.07	7.4-9.0	4-8	Low-----------	0.20		
	20-65	0-15	>20	0.03-0.05	>8.4	2-8	Low-----------	0.15		
1371*:										
Singatse---------	0-2	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24	1	6
	2-6	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24		
	6-12	---	---	---	---	---	--------------	----		
	12	---	---	---	---	---	--------------	----		
Flex-------------	0-3	8-18	2.0-6.0	0.07-0.09	6.1-7.3	<2	Low-----------	0.17	1	5
	3-10	18-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low-----------	0.17		
	10	---	---	---	---	---	--------------	----		
Acrelane---------	0-6	8-15	2.0-6.0	0.08-0.12	5.6-6.5	<2	Low-----------	0.17	1	4
	6-10	18-30	0.6-2.0	0.12-0.15	6.6-7.8	<2	Moderate------	0.20		
	10	---	---	---	---	---	--------------	----		
1372*:										
Singatse---------	0-2	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24	1	6
	2-6	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24		
	6-12	---	---	---	---	---	--------------	----		
	12	---	---	---	---	---	--------------	----		
Isolde-----------	0-6	0-5	>20	0.06-0.09	6.6-8.4	<2	Low-----------	0.28	5	1
	6-60	0-5	>20	0.06-0.09	6.6-8.4	<2	Low-----------	0.24		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1373*:										
Singatse--------	0-2	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24	1	6
	2-6	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24		
	6-12	---	---	---	---	---	-------------	----		
	12	---	---	---	---	---	-------------	----		
Mizel-----------	0-3	5-15	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low-----------	0.17	1	5
	3-7	---	---	---	---	---	-------------	----		
Stingdorn-------	0-4	18-27	0.6-2.0	0.04-0.07	7.9-8.4	<2	Low-----------	0.24	1	8
	4-9	28-35	0.2-0.6	0.09-0.12	7.9-8.4	<2	Moderate------	0.28		
	9-12	5-15	6.0-20	0.02-0.05	7.9-9.0	<2	Low-----------	0.15		
	12-13	---	---	---	---	---	-------------	----		
	13	---	---	---	---	---	-------------	----		
1374*:										
Singatse--------	0-2	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24	1	6
	2-6	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24		
	6-12	---	---	---	---	---	-------------	----		
	12	---	---	---	---	---	-------------	----		
Fireball--------	0-3	10-18	2.0-6.0	0.07-0.09	7.9-9.0	<2	Low-----------	0.24	3	8
	3-24	18-35	0.6-2.0	0.08-0.10	>8.4	<2	Moderate------	0.28		
	24-47	10-18	2.0-6.0	0.04-0.06	>8.4	<2	Low-----------	0.32		
	47	---	---	---	---	---	-------------	----		
Osobb-----------	0-2	12-18	2.0-6.0	0.05-0.07	7.4-9.0	<2	Low-----------	0.17	1	8
	2-11	12-18	2.0-6.0	0.05-0.07	>7.8	2-4	Low-----------	0.24		
	11-13	---	---	---	---	---	-------------	----		
	13	---	---	---	---	---	-------------	----		
1380*:										
Stingdorn-------	0-4	18-27	0.6-2.0	0.04-0.07	7.9-8.4	<2	Low-----------	0.24	1	8
	4-9	28-35	0.2-0.6	0.09-0.12	7.9-8.4	<2	Moderate------	0.28		
	9-12	5-15	6.0-20	0.02-0.05	7.9-9.0	<2	Low-----------	0.15		
	12-13	---	---	---	---	---	-------------	----		
	13	---	---	---	---	---	-------------	----		
Singatse--------	0-2	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24	1	6
	2-6	5-15	0.6-2.0	0.05-0.07	7.9-9.0	<2	Low-----------	0.24		
	6-12	---	---	---	---	---	-------------	----		
	12	---	---	---	---	---	-------------	----		
Rock outcrop.										
1390*:										
Pirouette-------	0-3	10-18	0.6-2.0	0.07-0.09	7.9-9.0	<2	Low-----------	0.24	1	8
	3-10	28-35	0.2-0.6	0.08-0.10	7.9-9.0	2-8	Moderate------	0.24		
	10-15	5-10	2.0-20	0.04-0.06	>8.4	4-8	Low-----------	0.17		
	15-16	---	---	---	---	---	-------------	----		
	16	---	---	---	---	---	-------------	----		
Osobb-----------	0-4	12-18	2.0-6.0	0.05-0.07	7.4-9.0	<2	Low-----------	0.32	1	8
	4-17	12-18	2.0-6.0	0.05-0.07	>7.8	2-4	Low-----------	0.24		
	17-18	---	---	---	---	---	-------------	----		
	18	---	---	---	---	---	-------------	----		
Rock outcrop.										
1400*:										
Softscrabble----	0-9	10-20	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low-----------	0.15	5	7
	9-30	27-35	0.2-0.6	0.08-0.10	6.1-7.3	<2	Moderate------	0.20		
	30-78	25-40	0.06-0.2	0.16-0.19	6.1-7.3	<2	Moderate------	0.32		
	78-89	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1400*:										
Gabica----------	0-14	5-15	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low----------	0.17	1	2
	14-19	24-35	0.2-0.6	0.05-0.09	5.6-7.3	<2	Low----------	0.15		
	19	---	---	---	---	---	-------------	----		
Burnborough-----	0-17	10-25	0.6-2.0	0.10-0.13	6.1-7.3	<2	Moderate-----	0.24	5	7
	17-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate-----	0.28		
1401*:										
Softscrabble----	0-9	10-20	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low----------	0.15	5	7
	9-30	27-35	0.2-0.6	0.08-0.10	6.1-7.3	<2	Moderate-----	0.20		
	30-78	25-40	0.06-0.2	0.16-0.19	6.1-7.3	<2	Moderate-----	0.32		
	78-89	---	---	---	---	---	-------------	----		
Gabica----------	0-9	10-15	0.6-2.0	0.10-0.12	5.6-7.3	<2	Low----------	0.24	1	8
	9-19	24-35	0.2-0.6	0.05-0.09	5.6-7.3	<2	Low----------	0.15		
	19	---	---	---	---	---	-------------	----		
Sumine----------	0-6	15-20	0.6-2.0	0.12-0.14	6.6-7.3	<2	Low----------	0.32	2	7
	6-34	25-35	0.6-2.0	0.10-0.13	6.6-7.3	<2	Moderate-----	0.28		
	34	---	---	---	---	---	-------------	----		
1410*:										
Burnborough-----	0-17	10-25	0.6-6.0	0.10-0.13	6.1-7.3	<2	Moderate-----	0.24	5	7
	17-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate-----	0.28		
Ticino----------	0-11	5-15	2.0-6.0	0.11-0.14	6.1-7.3	<2	Low----------	0.28	2	4
	11-22	18-35	0.6-2.0	0.14-0.17	6.1-7.3	<2	Moderate-----	0.37		
	22	---	---	---	---	---	-------------	----		
Gabica----------	0-14	5-15	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low----------	0.17	1	2
	14-19	24-35	0.2-0.6	0.05-0.09	5.6-7.3	<2	Low----------	0.15		
	19	---	---	---	---	---	-------------	----		
1411*:										
Burnborough-----	0-17	10-25	0.6-6.0	0.10-0.13	6.1-7.3	<2	Moderate-----	0.24	5	7
	17-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate-----	0.28		
Ticino----------	0-11	5-15	2.0-6.0	0.11-0.14	6.1-7.3	<2	Low----------	0.28	2	4
	11-22	18-35	0.6-2.0	0.14-0.17	6.1-7.3	<2	Moderate-----	0.37		
	22	---	---	---	---	---	-------------	----		
Softscrabble----	0-9	10-20	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low----------	0.15	5	7
	9-30	27-35	0.2-0.6	0.08-0.10	6.1-7.3	<2	Moderate-----	0.20		
	30-78	25-40	0.06-0.2	0.16-0.19	6.1-7.3	<2	Moderate-----	0.32		
	78-89	---	---	---	---	---	-------------	----		
1420*:										
Barshaad--------	0-1	10-25	0.2-0.6	0.08-0.12	6.6-8.4	<2	Low----------	0.20	2	8
	1-24	40-60	<0.06	0.10-0.14	6.6-8.4	<2	High---------	0.20		
	24	---	---	---	---	---	-------------	----		
Fugawee---------	0-9	10-20	2.0-6.0	0.08-0.10	5.6-6.5	<2	Low----------	0.15	2	8
	9-17	15-25	0.6-2.0	0.10-0.14	4.5-6.0	<2	Low----------	0.28		
	17-37	27-35	0.2-0.6	0.12-0.18	4.5-6.0	<2	Moderate-----	0.28		
	37	---	---	---	---	---	-------------	----		
Duckhill Variant	0-8	10-18	2.0-6.0	0.06-0.09	6.6-7.3	<2	Low----------	0.15	1	5
	8-13	18-30	0.2-0.6	0.09-0.12	6.1-7.3	<2	Moderate-----	0.24		
	13	---	---	---	---	---	-------------	----		
1430*:										
Fraval----------	0-9	12-20	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low----------	0.28	2	7
	9-27	20-35	0.6-2.0	0.10-0.12	5.6-6.5	<2	Moderate-----	0.24		
	27-40	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1430*:										
Booford----------	0-8	10-20	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low----------	0.37	2	6
	8-25	45-60	0.06-0.2	0.13-0.17	6.1-7.3	<2	High----------	0.20		
	25-45	---	---	---	---	---	-------------	----		
Jumbo------------	0-21	14-22	2.0-6.0	0.11-0.13	5.6-7.3	<2	Low----------	0.24	4	7
	21-54	20-30	2.0-6.0	0.09-0.11	5.6-7.3	<2	Moderate------	0.24		
	54-70	---	---	---	---	---	-------------	----		
1431*:										
Fraval-----------	0-9	12-20	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low----------	0.28	2	7
	9-27	20-35	0.6-2.0	0.10-0.12	5.6-6.5	<2	Moderate------	0.24		
	27-40	---	---	---	---	---	-------------	----		
Hirschdale-------	0-6	15-27	0.2-2.0	0.06-0.12	6.1-7.3	<2	Moderate------	0.20	2	8
	6-39	35-60	0.06-0.2	0.12-0.16	6.1-7.3	<2	High----------	0.24		
	39	---	---	---	---	---	-------------	----		
Duckhill Variant	0-8	10-18	2.0-6.0	0.06-0.09	6.6-7.3	<2	Low----------	0.15	1	5
	8-13	18-30	0.2-0.6	0.09-0.12	6.1-7.3	<2	Moderate------	0.24		
	13	---	---	---	---	---	-------------	----		
1432*:										
Fraval-----------	0-9	12-20	0.6-2.0	0.10-0.12	5.6-6.5	<2	Low----------	0.28	2	7
	9-27	20-35	0.6-2.0	0.10-0.12	5.6-6.5	<2	Moderate------	0.24		
	27-40	---	---	---	---	---	-------------	----		
Hirschdale-------	0-6	15-27	0.2-2.0	0.06-0.12	6.1-7.3	<2	Moderate------	0.20	2	8
	6-39	35-60	0.06-0.2	0.12-0.16	6.1-7.3	<2	High----------	0.24		
	39	---	---	---	---	---	-------------	----		
Jumbo------------	0-21	14-22	2.0-6.0	0.11-0.13	5.6-7.3	<2	Low----------	0.24	4	7
	21-54	20-30	2.0-6.0	0.09-0.11	5.6-7.3	<2	Moderate------	0.24		
	54-70	---	---	---	---	---	-------------	----		
1440--------------	0-26	5-15	2.0-6.0	0.05-0.07	5.6-6.5	<2	Low----------	0.05	3	8
Tallac	26-45	5-15	2.0-6.0	0.03-0.06	5.6-6.5	<2	Low----------	0.10		
	45-60	5-15	2.0-6.0	0.03-0.06	5.6-6.5	<2	Low----------	0.10		
1441--------------	0-26	5-15	2.0-6.0	0.07-0.09	5.6-6.5	<2	Low----------	0.10	3	8
Tallac	26-45	5-15	2.0-6.0	0.03-0.06	5.6-6.5	<2	Low----------	0.10		
	45-60	5-15	2.0-6.0	0.03-0.06	5.6-6.5	<2	Low----------	0.10		
1450*:										
Meiss------------	0-7	---	2.0-6.0	0.09-0.15	5.6-6.5	<2	Low----------	0.15	1	8
	7-20	---	2.0-6.0	0.09-0.15	5.6-6.5	<2	Low----------	0.15		
	20	---	---	---	---	---	-------------	----		
Sibelia----------	0-6	10-18	2.0-6.0	0.02-0.08	6.1-7.3	<2	Low----------	0.10	3	8
	6-20	10-18	2.0-6.0	0.03-0.08	6.1-7.3	<2	Low----------	0.10		
	20-47	10-18	2.0-6.0	0.04-0.07	6.1-7.3	<2	Low----------	0.10		
	47	---	---	---	---	---	-------------	----		
Rock outcrop.										
1460*:										
Jorge------------	0-9	10-20	2.0-6.0	0.07-0.10	5.6-6.5	<2	Low----------	0.15	3	8
	9-24	10-25	2.0-6.0	0.07-0.09	5.6-6.5	<2	Low----------	0.15		
	24-52	20-35	0.6-2.0	0.06-0.10	4.5-6.0	<2	Low----------	0.20		
	52-65	10-20	2.0-6.0	0.05-0.08	5.1-6.0	<2	Low----------	0.15		
	65	---	---	---	---	---	-------------	----		
Boomtown---------	0-17	10-20	0.6-2.0	0.08-0.12	5.6-6.5	<2	Low----------	0.20	5	5
	17-22	10-20	0.2-0.6	0.10-0.15	5.6-6.5	<2	Low----------	0.28		
	22-53	35-50	0.06-0.2	0.12-0.16	5.6-6.5	<2	High----------	0.17		
	53-61	27-40	0.06-0.2	0.15-0.18	5.6-6.5	<2	Moderate------	0.28		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1460*:										
Fugawee	0-5	10-20	2.0-6.0	0.07-0.09	5.6-6.5	<2	Low	0.10	2	8
	5-17	15-25	0.6-2.0	0.10-0.14	4.5-6.0	<2	Low	0.28		
	17-29	18-35	0.2-0.6	0.12-0.18	4.5-6.0	<2	Moderate	0.28		
	29	---	---	---	---	---	---	----		
1470*:										
Carioca	0-7	5-15	2.0-6.0	0.06-0.08	5.6-6.5	<2	Low	0.10	5	4
	7-30	5-15	2.0-6.0	0.06-0.08	5.6-6.5	<2	Low	0.10		
	30-56	15-30	0.6-2.0	0.09-0.11	5.6-6.5	<2	Moderate	0.28		
	56-65	15-27	0.6-2.0	0.10-0.13	5.6-6.5	<2	Moderate	0.28		
	65	---	---	---	---	---	---	----		
Sibelia Variant	0-21	8-18	2.0-6.0	0.10-0.12	5.6-6.0	<2	Low	0.28	5	5
	21-60	8-18	2.0-6.0	0.08-0.10	5.6-6.5	<2	Low	0.32		
Fugawee	0-9	10-20	2.0-6.0	0.07-0.09	5.6-6.5	<2	Low	0.10	2	8
	9-17	15-25	0.6-2.0	0.10-0.14	4.5-6.0	<2	Low	0.28		
	17-37	27-35	0.2-0.6	0.12-0.18	4.5-6.0	<2	Moderate	0.28		
	37	---	---	---	---	---	---	----		
1480*:										
Macareeno	0-11	10-27	0.6-6.0	0.13-0.17	6.1-7.3	<2	Moderate	0.28	5	5
	11-41	27-35	0.06-0.2	0.13-0.18	5.6-6.5	<2	Moderate	0.28		
	41-54	18-27	0.6-2.0	0.08-0.11	6.1-6.5	<2	Moderate	0.28		
Blackwell	0-11	5-15	0.6-2.0	0.13-0.16	6.1-7.3	<2	Low	0.24	5	---
	11-60	20-30	0.2-0.6	0.12-0.14	6.1-7.3	<2	Moderate	0.28		
Carioca	0-7	5-15	2.0-6.0	0.06-0.08	5.6-6.5	<2	Low	0.10	5	4
	7-30	5-15	2.0-6.0	0.06-0.08	5.6-6.5	<2	Low	0.10		
	30-56	15-30	0.6-2.0	0.09-0.11	5.6-6.5	<2	Moderate	0.28		
	56-65	15-27	0.6-2.0	0.10-0.13	5.6-6.5	<2	Moderate	0.28		
	65	---	---	---	---	---	---	----		
1490*:										
Arzo	0-2	20-27	0.2-0.6	0.06-0.13	6.6-8.4	<2	Moderate	0.24	2	8
	2-27	35-45	0.06-0.2	0.13-0.16	6.6-8.4	<2	High	0.28		
	27-35	15-27	0.2-0.6	0.06-0.16	6.6-8.4	<2	Moderate	0.32		
	35	---	---	---	---	---	---	----		
Indiano	0-13	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low	0.32	3	4
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate	0.28		
	33	---	---	---	---	---	---	----		
Barnard	0-15	5-15	0.6-2.0	0.16-0.19	6.1-7.3	<2	Low	0.20	1	4
	15-26	40-50	0.06-0.2	0.13-0.16	6.1-7.3	<2	High	0.28		
	26	---	---	---	---	---	---	----		
1510*:										
Cagle	0-2	30-35	0.2-0.6	0.16-0.17	6.6-7.3	<2	Moderate	0.28	3	8
	2-16	40-50	0.06-0.2	0.13-0.15	6.6-7.3	<2	High	0.24		
	16-39	35-50	0.06-0.2	0.07-0.09	6.6-7.3	<2	High	0.24		
	39	---	---	---	---	---	---	----		
Nosrac	0-14	27-30	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate	0.28	5	8
	14-38	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.32		
	38-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.28		
Old Camp	0-2	5-15	2.0-6.0	0.07-0.09	6.6-7.8	<2	Low	0.17	1	8
	2-14	25-35	0.2-2.0	0.08-0.11	6.6-8.6	<2	Moderate	0.15		
	14	---	---	---	---	---	---	----		
1520*:										
Duco	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low	0.17	1	5
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.24		
	19	---	---	---	---	---	---	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1520*:										
Smallcone--------	0-6	5-15	6.0-20	0.02-0.07	5.1-6.0	<2	Low-----------	0.10	1	6
	6	---	---	---	---	---	-------------	----		
Cagle------------	0-2	30-35	0.2-0.6	0.16-0.17	6.6-7.3	<2	Moderate------	0.28	3	8
	2-16	40-50	0.06-0.2	0.13-0.15	6.6-7.3	<2	High----------	0.24		
	16-39	35-55	0.06-0.2	0.07-0.09	6.6-7.3	<2	High----------	0.24		
	39	---	---	---	---	---	-------------	----		
1521*:										
Duco-------------	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low-----------	0.17	1	5
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate------	0.24		
	19	---	---	---	---	---	-------------	----		
Yuko-------------	0-2	15-27	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate------	0.24	1	6
	2-8	32-35	0.2-0.6	0.15-0.17	6.1-7.8	<2	Moderate------	0.37		
	8	---	---	---	---	---	-------------	----		
Lemm-------------	0-19	5-15	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low-----------	0.17	5	6
	19-40	10-18	2.0-6.0	0.08-0.10	5.6-7.3	<2	Low-----------	0.20		
	40-60	3-8	6.0-20	0.06-0.08	5.6-7.3	<2	Low-----------	0.10		
1522*:										
Duco-------------	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low-----------	0.17	1	5
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate------	0.24		
	19	---	---	---	---	---	-------------	----		
Pahrange---------	0-11	10-15	2.0-6.0	0.03-0.09	6.1-7.3	<2	Low-----------	0.10	2	6
	11-26	27-35	0.2-0.6	0.11-0.14	6.1-7.3	<2	Moderate------	0.24		
	26	---	---	---	---	---	-------------	----		
Lemm-------------	0-19	5-15	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low-----------	0.17	5	6
	19-40	10-18	2.0-6.0	0.08-0.10	5.6-7.3	<2	Low-----------	0.20		
	40-60	3-8	6.0-20	0.06-0.08	5.6-7.3	<2	Low-----------	0.10		
1530*:										
Bombadil---------	0-4	10-15	2.0-6.0	0.10-0.12	6.6-7.8	<2	Low-----------	0.24	1	5
	4-13	18-25	0.2-0.6	0.15-0.17	6.6-7.8	<2	Moderate------	0.32		
	13-20	---	---	---	---	---	-------------	----		
Hefed------------	0-2	10-20	6.0-20	0.03-0.08	6.6-7.8	<2	Low-----------	0.10	5	6
	2-13	18-27	2.0-6.0	0.03-0.11	7.4-8.4	<2	Moderate------	0.17		
	13-75	5-10	6.0-20	0.02-0.06	7.4-8.4	<2	Low-----------	0.10		
Rubble land.										
1531*:										
Bombadil---------	0-4	10-15	2.0-6.0	0.10-0.12	6.6-7.8	<2	Low-----------	0.24	1	5
	4-13	18-25	0.2-0.6	0.15-0.17	6.6-7.8	<2	Moderate------	0.32		
	13-20	---	---	---	---	---	-------------	----		
Hefed------------	0-2	10-20	6.0-20	0.03-0.08	6.6-7.8	<2	Low-----------	0.10	5	6
	2-13	18-27	2.0-6.0	0.03-0.11	7.4-8.4	<2	Moderate------	0.17		
	13-75	5-10	6.0-20	0.02-0.06	7.4-8.4	<2	Low-----------	0.10		
Fireball---------	0-3	10-18	2.0-6.0	0.07-0.09	7.9-9.0	<2	Low-----------	0.24	3	8
	3-24	18-35	0.6-2.0	0.08-0.10	>8.4	<2	Moderate------	0.28		
	24-47	10-18	2.0-6.0	0.04-0.06	>8.4	<2	Low-----------	0.32		
	47	---	---	---	---	---	-------------	----		
1540*:										
McQuarrie--------	0-1	8-15	0.6-2.0	0.05-0.10	6.6-8.4	<2	Low-----------	0.17	1	8
	1-8	20-35	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low-----------	0.37		
	8-18	20-35	0.6-2.0	0.13-0.17	7.4-8.4	<2	Low-----------	0.32		
	18	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1540*:										
Tristan----------	0-7	10-20	0.6-2.0	0.07-0.08	6.6-7.8	<2	Low-----------	0.28	3	8
	7-28	18-35	0.2-0.6	0.06-0.10	6.6-7.8	<2	Moderate------	0.24		
	28-49	18-27	0.2-0.6	0.04-0.06	6.6-7.8	<2	Moderate------	0.10		
	49	---	---	---	---	---	--------------	----		
Arzo-------------	0-2	20-27	0.2-0.6	0.06-0.13	6.6-8.4	<2	Moderate------	0.24	2	8
	2-27	35-45	0.06-0.2	0.13-0.16	6.6-8.4	<2	High----------	0.28		
	27-35	15-27	0.2-0.6	0.06-0.16	6.6-8.4	<2	Moderate------	0.32		
	35	---	---	---	---	---	--------------	----		
1541*:										
McQuarrie--------	0-3	8-15	0.6-2.0	0.05-0.10	6.6-8.4	<2	Low-----------	0.17	1	8
	3-9	20-35	0.6-2.0	0.15-0.17	7.4-8.4	<2	Low-----------	0.37		
	9-13	20-35	0.6-2.0	0.13-0.17	7.4-8.4	<2	Low-----------	0.32		
	13	---	---	---	---	---	--------------	----		
Duco-------------	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low-----------	0.17	1	5
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate------	0.24		
	19	---	---	---	---	---	--------------	----		
Tristan----------	0-7	10-20	0.6-2.0	0.07-0.08	6.6-7.8	<2	Low-----------	0.28	3	8
	7-28	18-35	0.2-0.6	0.06-0.10	6.6-7.8	<2	Moderate------	0.24		
	28-49	18-27	0.2-0.6	0.04-0.06	6.6-7.8	<2	Moderate------	0.10		
	49	---	---	---	---	---	--------------	----		
1550*:										
Skedaddle--------	0-8	18-27	0.6-2.0	0.06-0.10	6.6-7.8	<2	Low-----------	0.28	1	7
	8-11	---	---	---	---	---	--------------	----		
	8-20	---	---	---	---	---	--------------	----		
Pahrange---------	0-11	10-15	2.0-6.0	0.03-0.09	6.1-7.3	<2	Low-----------	0.10	2	6
	11-26	27-35	0.2-0.6	0.11-0.14	6.1-7.3	<2	Moderate------	0.24		
	26	---	---	---	---	---	--------------	----		
Lemm-------------	0-19	5-15	2.0-6.0	0.06-0.08	5.6-7.3	<2	Low-----------	0.17	5	6
	19-40	10-18	2.0-6.0	0.08-0.10	5.6-7.3	<2	Low-----------	0.20		
	40-60	3-8	6.0-20	0.06-0.08	5.6-7.3	<2	Low-----------	0.10		
1570*:										
Bluewing---------	0-7	3-10	>6.0	0.04-0.05	7.4-9.0	<2	Low-----------	0.15	5	4
	7-60	3-10	>20	0.04-0.06	7.4-9.0	<4	Low-----------	0.10		
Biddleman--------	0-3	8-15	2.0-6.0	0.08-0.11	7.9-9.0	2-4	Low-----------	0.32	1	4
	3-8	20-30	0.2-0.6	0.12-0.14	7.9-9.0	2-4	Moderate------	0.37		
	8-60	2-10	>20	0.03-0.05	7.9-9.0	<2	Low-----------	0.10		
Bundorf----------	0-2	10-27	0.6-2.0	0.04-0.07	7.9-9.0	<2	Low-----------	0.28	1	8
	2-10	35-50	0.06-0.2	0.16-0.18	7.9-9.0	<2	High----------	0.32		
	10-19	15-35	0.06-0.2	0.09-0.11	>8.4	<2	High----------	0.28		
	19-27	---	---	---	---	---	--------------	----		
1580*:										
Frodo------------	0-6	15-27	0.6-2.0	0.03-0.11	6.1-7.3	<2	Moderate------	0.20	1	8
	6-18	35-60	0.06-0.2	0.11-0.17	6.6-8.4	<2	High----------	0.17		
	18-23	---	---	---	---	---	--------------	----		
	23-30	---	---	---	---	---	--------------	----		
Xman-------------	0-2	12-18	2.0-6.0	0.10-0.12	6.1-7.3	<2	Low-----------	0.32	1	5
	2-14	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High----------	0.24		
	14-29	---	---	---	---	---	--------------	----		
	29	---	---	---	---	---	--------------	----		
Oppio------------	0-3	8-20	2.0-6.0	0.07-0.11	5.6-7.3	<2	Low-----------	0.28	3	4
	3-21	35-50	0.06-0.2	0.14-0.17	5.6-7.3	<2	High----------	0.20		
	21	---	---	---	---	---	--------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1590-------------	0-6	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low----------	0.15	1	3
Ruhe	6-14	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low----------	0.15		
	14-35	---	---	---	---	---	-------------	----		
	35-60	0-5	6.0-20	0.01-0.03	>7.8	4-8	Low----------	0.15		
1600*:										
Wrango----------	0-8	0-8	>20	0.05-0.07	7.4-8.4	<2	Low----------	0.17	1	4
	8-60	0-8	>20	0.03-0.05	7.4-8.4	<2	Low----------	0.10		
Ruhe------------	0-6	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low----------	0.15	1	3
	6-14	0-5	6.0-20	0.04-0.09	7.9-9.0	2-4	Low----------	0.15		
	14-35	---	---	---	---	---	-------------	----		
	35-60	0-5	6.0-20	0.01-0.03	>7.8	4-8	Low----------	0.15		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
101, 102, 106----------- Aquinas	C	None------------	---	---	>6.0	---	---
110--------------------- Jowec Variant	D	None------------	---	---	>6.0	---	---
111*:							
Jowec Variant----------	D	None------------	---	---	>6.0	---	---
Greenbrae--------------	C	None------------	---	---	>6.0	---	---
120--------------------- Doten	D	Rare------------	---	---	5.0-6.0	Apparent	Feb-May
121--------------------- Doten	D	None------------	---	---	>6.0	---	---
130, 131, 132, 134, 136- Greenbrae	C	None------------	---	---	>6.0	---	---
140, 141, 142----------- Haybourne	B	Rare------------	---	---	>6.0	---	---
150, 151---------------- Doten Variant	D	None------------	---	---	5.0-6.0	Apparent	Feb-May
160, 161---------------- Incy	A	None------------	---	---	>6.0	---	---
171, 172, 173, 174, 175- Indian Creek	D	None------------	---	---	>6.0	---	---
176*:							
Indian Creek-----------	D	None------------	---	---	>6.0	---	---
Reno-------------------	D	None------------	---	---	>6.0	---	---
Washoe-----------------	B	None------------	---	---	>6.0	---	---
190, 191, 192----------- Manogue	D	None------------	---	---	>6.0	---	---
200, 201, 202, 203------ Northmore	C	None------------	---	---	>6.0	---	---
210, 211---------------- Luppino	D	None------------	---	---	>6.0	---	---
221, 222---------------- Oppio	D	None------------	---	---	>6.0	---	---
223*:							
Oppio------------------	D	None------------	---	---	>6.0	---	---
Rezave-----------------	D	None------------	---	---	>6.0	---	---
Rock outcrop.							
230--------------------- Cradlebaugh	D	Occasional------	Brief to long	Mar-May	1.0-2.0	Apparent	Feb-Jun

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
240 Updike	D	None	---	---	5.0-6.0	Apparent	Feb-May
241 Updike	D	Rare	---	---	4.0-6.0	Apparent	Mar-Aug
250, 251, 252 Cassiro	C	None	---	---	>6.0	---	---
260*:							
Acrelane	C	None	---	---	>6.0	---	---
Rock outcrop.							
262 Acrelane	C	None	---	---	>6.0	---	---
280, 281, 282 Wedekind	D	None	---	---	>6.0	---	---
290, 291 Verdico Variant	D	None	---	---	>6.0	---	---
300 Surgem	C	None	---	---	>6.0	---	---
301*, 302*:							
Surgem	C	None	---	---	>6.0	---	---
Rock outcrop.							
310*, 311*:							
Risley	D	None	---	---	>6.0	---	---
Rock outcrop.							
312, 313 Risley	D	None	---	---	>6.0	---	---
314*:							
Risley	D	None	---	---	>6.0	---	---
Xman	D	None	---	---	>6.0	---	---
Rock outcrop.							
341 Yuko	D	None	---	---	>6.0	---	---
342*:							
Yuko	D	None	---	---	>6.0	---	---
Reywat	D	None	---	---	>6.0	---	---
Rock outcrop.							
350 Mizel	D	None	---	---	>6.0	---	---
351*:							
Mizel	D	None	---	---	>6.0	---	---
Skedaddle	D	None	---	---	>6.0	---	---
Rock outcrop.							

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
360*. Pits							
370----------------------- Lemm	B	Rare------------	---	---	>6.0	---	---
390----------------------- Duckhill	D	None------------	---	---	>6.0	---	---
391*:							
Duckhill----------------	D	None------------	---	---	>6.0	---	---
Hirschdale--------------	C	None------------	---	---	>6.0	---	---
Fraval------------------	C	None------------	---	---	>6.0	---	---
400, 401, 403----------- Jubilee Variant	C	Rare------------	---	---	1.5-3.0	Apparent	Dec-Apr
410, 411----------------- Ophir	C	Rare------------	---	---	1.5-3.5	Apparent	Dec-May
420----------------------- Godecke	D	None------------	---	---	2.5-3.5	Apparent	Dec-Jun
423----------------------- Godecke Variant	D	None------------	---	---	>6.0	---	---
430, 431----------------- Sagouspe Variant	C	Rare------------	---	---	0.5-3.0	Apparent	Jan-Jul
440, 441, 442, 443------ Jubilee	C	Rare------------	---	---	1.5-2.5	Apparent	Dec-Jun
445----------------------- Jubilee	B	Rare------------	---	---	4.0-6.0	Apparent	Dec-Apr
450, 451, 452----------- Voltaire	D	Rare------------	---	---	0-1.5	Apparent	Feb-May
454----------------------- Voltaire	C	Rare------------	---	---	5.0-6.0	Apparent	Dec-May
455*:							
Voltaire----------------	C	Rare------------	---	---	5.0-6.0	Apparent	Dec-May
Truckee-----------------	B	Rare------------	---	---	>6.0	---	---
456----------------------- Voltaire	D	Rare------------	---	---	3.5-6.0	Apparent	Feb-Jul
460, 461----------------- Surprise	B	Rare------------	---	---	>6.0	---	---
470----------------------- Dalzell	C	None------------	---	---	3.5-5.0	Apparent	Mar-Jun
480, 482----------------- Holbrook	B	Rare------------	---	---	>6.0	---	---
490----------------------- Graufels	C	None------------	---	---	>6.0	---	---
491*:							
Graufels----------------	C	None------------	---	---	>6.0	---	---
Rock outcrop.							

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
492----- Graufels	C	None-----	---	---	>6.0	---	---
493*:							
Graufels-----	C	None-----	---	---	>6.0	---	---
Glenbrook-----	D	None-----	---	---	>6.0	---	---
494----- Graufels	C	None-----	---	---	>6.0	---	---
495*:							
Graufels-----	C	None-----	---	---	>6.0	---	---
Glenbrook-----	D	None-----	---	---	>6.0	---	---
Rock outcrop.							
496*:							
Graufels-----	C	None-----	---	---	>6.0	---	---
Glenbrook-----	D	None-----	---	---	>6.0	---	---
Haypress-----	A	None-----	---	---	>6.0	---	---
500, 504----- Mottsville	A	Rare-----	---	---	>6.0	---	---
505----- Mottsville	A	None-----	---	---	>6.0	---	---
510----- Settlemeyer	D	Rare-----	---	---	1.5-3.5	Apparent	Feb-Jul
513*:							
Settlemeyer-----	D	Rare-----	---	---	1.5-3.5	Apparent	Feb-Jul
Notus-----	A	Occasional-----	Very brief to brief.	Dec-Apr	4.0-6.0	Apparent	Dec-May
514----- Settlemeyer	D	Rare-----	---	---	1.0-2.5	Apparent	Feb-Jul
520----- Dressler	C	Rare-----	---	---	2.5-3.5	Apparent	Feb-May
530, 531----- Sagouspe	C	Rare-----	---	---	3.0-3.5	Apparent	Feb-Aug
532----- Sagouspe	C	Occasional-----	Brief-----	Jan-May	2.5-3.5	Apparent	Feb-Aug
550, 551, 553----- Leviathan	B	None-----	---	---	>6.0	---	---
554, 557, 559----- Leviathan	C	None-----	---	---	>6.0	---	---
570----- Turria	C	Rare-----	---	---	>6.0	---	---
585*:							
Barnard-----	D	None-----	---	---	>6.0	---	---
Trosi-----	D	None-----	---	---	>6.0	---	---

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
590, 591, 595 Springmeyer	C	None	---	---	>6.0	---	---
600, 601 Idlewild	D	None	---	---	>6.0	---	---
602 Idlewild	D	Rare	---	---	2.5-5.0	Apparent	Jan-May
612, 613, 614, 615 Verdico	D	None	---	---	>6.0	---	---
620, 621 Orr	B	None	---	---	>6.0	---	---
622 Orr	C	None	---	---	>6.0	---	---
623, 624 Orr	B	None	---	---	>6.0	---	---
630 Fleischmann	D	None	---	---	>6.0	---	---
631 Fleischmann	D	None	---	---	>6.0	---	---
632 Fleischmann	D	None	---	---	>6.0	---	---
640 Notus	A	Occasional	Very brief to brief.	Dec-Apr	4.0-6.0	Apparent	Dec-May
650 Chalco	D	None	---	---	>6.0	---	---
651, 652, 653 Chalco	D	None	---	---	>6.0	---	---
654*:							
Chalco	D	None	---	---	>6.0	---	---
Celeton Variant	D	None	---	---	>6.0	---	---
660, 661, 662, 663, 664, 668, 669 Oest	B	None	---	---	>6.0	---	---
670, 671, 673, 674 Galeppi	B	None	---	---	>6.0	---	---
676*:							
Galeppi	B	None	---	---	>6.0	---	---
Barnard	D	None	---	---	>6.0	---	---
681, 683 Reno	D	None	---	---	>6.0	---	---
730, 731 Stodick	D	None	---	---	>6.0	---	---
740 Blackwell	D	Occasional	Very brief to brief.	Apr-Jun	0.5-2.5	Apparent	Mar-Jul

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
752*, 753*:							
Toiyabe	C	None	---	---	>6.0	---	---
Corbett	B	None	---	---	>6.0	---	---
Rock outcrop.							
754*:							
Toiyabe	C	None	---	---	>6.0	---	---
Rock outcrop.							
756*:							
Toiyabe	C	None	---	---	>6.0	---	---
Corbett	B	None	---	---	>6.0	---	---
Haypress	A	None	---	---	>6.0	---	---
772, 775 Booford	C	None	---	---	>6.0	---	---
780, 782 Bieber	D	None	---	---	>6.0	---	---
800 Truckee	C	Rare	---	---	2.5-5.0	Apparent	Dec-Jul
802 Truckee	C	Rare	---	---	2.5-5.0	Apparent	Dec-Jul
805 Truckee	C	Rare	---	---	>6.0	---	---
806 Truckee	C	Rare	---	---	2.5-5.0	Apparent	Dec-Jul
810, 812, 813 Rose Creek	B	Rare	---	---	4.0-6.0	Apparent	Feb-Jul
820, 821 Marla	D	Occasional	Brief	Nov-Apr	1.0-2.0	Apparent	Jan-Jun
830, 831 Fettic	D	Rare	---	---	1.5-3.5	Apparent	Dec-Aug
840*:							
Temo	C	None	---	---	>6.0	---	---
Witefels	B	None	---	---	>6.0	---	---
Rock outcrop.							
850 Washoe	B	None	---	---	>6.0	---	---
861, 862 Reywat	D	None	---	---	>6.0	---	---
863*:							
Reywat	D	None	---	---	>6.0	---	---
Rock outcrop.							
870*:							
Xman	D	None	---	---	>6.0	---	---
Rock outcrop.							

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
871, 872: Xman	D	None	---	---	>6.0	---	---
873*:							
Xman	D	None	---	---	>6.0	---	---
Rock outcrop.							
875*:							
Xman	D	None	---	---	>6.0	---	---
875*:							
Zephan	C	None	---	---	>6.0	---	---
Mizel	D	None	---	---	>6.0	---	---
876*:							
Xman	D	None	---	---	>6.0	---	---
Oppio	D	None	---	---	>6.0	---	---
Old Camp	D	None	---	---	>6.0	---	---
877*:							
Xman	D	None	---	---	>6.0	---	---
Frodo	D	None	---	---	>6.0	---	---
Mizel	D	None	---	---	>6.0	---	---
880*:							
Zephan	C	None	---	---	>6.0	---	---
Rock outcrop.							
Smallcone	D	None	---	---	>6.0	---	---
881, 882: Zephan	C	None	---	---	>6.0	---	---
890, 891: Indiano	C	None	---	---	>6.0	---	---
892*:							
Indiano	C	None	---	---	>6.0	---	---
Koontz	D	None	---	---	>6.0	---	---
Flex	D	None	---	---	>6.0	---	---
893*:							
Indiano	C	None	---	---	>6.0	---	---
Duco	D	None	---	---	>6.0	---	---
Cagle	D	None	---	---	>6.0	---	---
894*:							
Indiano	C	None	---	---	>6.0	---	---
Duco	D	None	---	---	>6.0	---	---
Skedaddle	D	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
895*:							
Indiano-----------------	C	None-------------	---	---	>6.0	---	---
Zephan------------------	C	None-------------	---	---	>6.0	---	---
Duco--------------------	D	None-------------	---	---	>6.0	---	---
900, 901, 903----------- Flex	D	None-------------	---	---	>6.0	---	---
910, 911---------------- Vamp	C	Rare-------------	---	---	2.5-3.5	Apparent	Feb-Jul
930--------------------- Old Camp	D	None-------------	---	---	>6.0	---	---
931*:							
Old Camp---------------- extremely stony	D	None-------------	---	---	>6.0	---	---
Old Camp---------------- stony	D	None-------------	---	---	>6.0	---	---
Rock outcrop.							
932--------------------- Old Camp	D	None-------------	---	---	>6.0	---	---
960, 961, 962, 963------ Kayo	B	Rare-------------	---	---	>6.0	---	---
971, 974---------------- Aladshi	B	Rare-------------	---	---	>6.0	---	---
980, 982---------------- Koontz	D	None-------------	---	---	>6.0	---	---
990*. Rock outcrop							
991*:							
Xeric Torriorthents.							
Urban land.							
992*. Playas							
993*. Haplaquolls							
994*:							
Badland.							
Chalco------------------	D	None-------------	---	---	>6.0	---	---
Verdico-----------------	D	None-------------	---	---	>6.0	---	---
996*:							
Dune land.							
Playas.							
997*. Badland							

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
998*. Beaches							
1010------ Gabica	D	None------	---	---	>6.0	---	---
1040, 1041------ Orr Variant	B	Rare------	---	---	>6.0	---	---
1050, 1051------ Waspo	D	None------	---	---	>6.0	---	---
1052*:							
Waspo------	D	None------	---	---	>6.0	---	---
Rock outcrop.							
1054------ Waspo	D	None------	---	---	>6.0	---	---
1060*, 1062*:							
Witefels------	B	None------	---	---	>6.0	---	---
Rock outcrop.							
1080------ Inville Variant	C	Rare------	---	---	2.5-3.5	Apparent	Jan-Jun
1090, 1091------ Railcity	A	None------	---	---	>6.0	---	---
1100*:							
Graylock------	B	None------	---	---	>6.0	---	---
Temo------	C	None------	---	---	>6.0	---	---
Rock outcrop.							
1120, 1121------ Apmat	B	None------	---	---	>6.0	---	---
1130------ Dithod	C	Rare------	---	---	4.0-6.0	Apparent	Dec-Aug
1141, 1142, 1143------ Bedell	B	Rare------	---	---	>6.0	---	---
1160, 1161------ Jowec	D	Rare------	---	---	>6.0	---	---
1170, 1171, 1172------ Wedertz	B	Rare------	---	---	>6.0	---	---
1181*, 1182*:							
Haypress------	A	None------	---	---	>6.0	---	---
Tanob------	B	None------	---	---	>6.0	---	---
Rock outcrop.							
1183*:							
Haypress------	A	None------	---	---	>6.0	---	---
Rock outcrop.							

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
1190, 1191, 1192, 1193, 1194 Spasprey	C	None	---	---	>6.0	---	---
1200 Mellor	C	None	---	---	>6.0	---	---
1210 Linhart	A	Occasional	Very brief	Apr-Oct	>6.0	---	---
1211 Linhart	A	Rare	---	---	>6.0	---	---
1220 Calpine	B	None	---	---	>6.0	---	---
1240 Pizene	B	None	---	---	>6.0	---	---
1250, 1251 Rednik	B	Rare	---	---	>6.0	---	---
1260*:							
Thulepah	C	None	---	---	>6.0	---	---
Mosquet	D	None	---	---	>6.0	---	---
1270*:							
Tristan	B	None	---	---	>6.0	---	---
Indiano	C	None	---	---	>6.0	---	---
Lemm	B	None	---	---	>6.0	---	---
1271*:							
Tristan	B	None	---	---	>6.0	---	---
Barshaad	D	None	---	---	>6.0	---	---
Arzo	D	None	---	---	>6.0	---	---
1272*:							
Tristan	B	None	---	---	>6.0	---	---
Arzo	D	None	---	---	>6.0	---	---
Reywat	D	None	---	---	>6.0	---	---
1273*:							
Tristan	B	None	---	---	>6.0	---	---
Barshaad	D	None	---	---	>6.0	---	---
Frodo	D	None	---	---	>6.0	---	---
1290 Parran	D	Rare	---	---	2.0-3.0	Apparent	Nov-Mar
1300, 1301 Rose Creek Variant	B	Rare	---	---	5.0-6.0	Apparent	Feb-Mar
1310 Bango	B	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
1320*:							
Osobb	D	None	---	---	>6.0	---	---
Rezave	D	None	---	---	>6.0	---	---
Fireball	B	None	---	---	>6.0	---	---
1330*:							
Sutcliff	C	None	---	---	>6.0	---	---
Kleinbush	D	None	---	---	>6.0	---	---
Washoe	B	None	---	---	>6.0	---	---
1331*:							
Sutcliff	C	None	---	---	>6.0	---	---
Bundorf	D	None	---	---	>6.0	---	---
Kleinbush	D	None	---	---	>6.0	---	---
1340*:							
Hawsley	A	None	---	---	>6.0	---	---
Ruhe	D	None	---	---	>6.0	---	---
Bluewing	A	Occasional	Very brief	Jul-Sep	>6.0	---	---
1341*:							
Isolde	A	None	---	---	>6.0	---	---
Dune land.							
1342*:							
Isolde	A	None	---	---	>6.0	---	---
Playas.							
1344*:							
Isolde	A	None	---	---	>6.0	---	---
Toulon	A	None	---	---	>6.0	---	---
1345 Hawsley	A	None	---	---	>6.0	---	---
1350*:							
Stumble	A	None	---	---	>6.0	---	---
Ruhe	D	None	---	---	>6.0	---	---
Bluewing	A	Occasional	Very brief	Jul-Sep	>6.0	---	---
1351 Stumble	A	None	---	---	>6.0	---	---
1360*:							
Trocken	B	Rare	---	---	>6.0	---	---
Stumble	A	None	---	---	>6.0	---	---
Bluewing	A	Occasional	Very brief	Jul-Sep	>6.0	---	---

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
1361*:							
Trocken	B	Rare	---	---	>6.0	---	---
Ruhe	D	None	---	---	>6.0	---	---
Bluewing	A	Occasional	Very brief	Jul-Sep	>6.0	---	---
1362*:							
Trocken	B	Rare	---	---	>6.0	---	---
Badland.							
1363 Trocken	B	Rare	---	---	>6.0	---	---
1364*:							
Trocken	B	Rare	---	---	>6.0	---	---
Wrango	A	Rare	---	---	>6.0	---	---
1370*:							
Singatse	D	None	---	---	>6.0	---	---
Fireball	B	None	---	---	>6.0	---	---
Rednik	B	Rare	---	---	>6.0	---	---
1371*:							
Singatse	D	None	---	---	>6.0	---	---
Flex	D	None	---	---	>6.0	---	---
Acrelane	C	None	---	---	>6.0	---	---
1372*:							
Singatse	D	None	---	---	>6.0	---	---
Isolde	A	None	---	---	>6.0	---	---
1373*:							
Singatse	D	None	---	---	>6.0	---	---
Mizel	D	None	---	---	>6.0	---	---
Stingdorn	D	None	---	---	>6.0	---	---
1374*:							
Singatse	D	None	---	---	>6.0	---	---
Fireball	B	None	---	---	>6.0	---	---
Osobb	D	None	---	---	>6.0	---	---
1380*:							
Stingdorn	D	None	---	---	>6.0	---	---
Singatse	D	None	---	---	>6.0	---	---
Rock outcrop.							
1390*:							
Pirouette	D	None	---	---	>6.0	---	---
Osobb	D	None	---	---	>6.0	---	---
Rock outcrop.							

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
1400*:							
Softscrabble	C	None	---	---	>6.0	---	---
Gabica	D	None	---	---	>6.0	---	---
Burnborough	B	None	---	---	>6.0	---	---
1401*:							
Softscrabble	C	None	---	---	>6.0	---	---
Gabica	D	None	---	---	>6.0	---	---
Sumine	B	None	---	---	>6.0	---	---
1410*:							
Burnborough	B	None	---	---	>6.0	---	---
Ticino	C	None	---	---	>6.0	---	---
Gabica	D	None	---	---	>6.0	---	---
1411*:							
Burnborough	B	None	---	---	>6.0	---	---
Ticino	C	None	---	---	>6.0	---	---
Softscrabble	C	None	---	---	>6.0	---	---
1420*:							
Barshaad	D	None	---	---	>6.0	---	---
Fugawee	B	None	---	---	>6.0	---	---
Duckhill Variant	D	None	---	---	>6.0	---	---
1430*:							
Fraval	C	None	---	---	>6.0	---	---
Booford	C	None	---	---	>6.0	---	---
Jumbo	B	None	---	---	>6.0	---	---
1431*:							
Fraval	C	None	---	---	>6.0	---	---
Hirschdale	C	None	---	---	>6.0	---	---
Duckhill Variant	D	None	---	---	>6.0	---	---
1432*:							
Fraval	C	None	---	---	>6.0	---	---
Hirschdale	C	None	---	---	>6.0	---	---
Jumbo	B	None	---	---	>6.0	---	---
1440, 1441 Tallac	B	None	---	---	>6.0	---	---
1450*:							
Meiss	D	None	---	---	>6.0	---	---
Sibelia	A	None	---	---	>6.0	---	---
Rock outcrop.							

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
1460*:							
Jorge	B	None	---	---	>6.0	---	---
Boomtown	D	None	---	---	>6.0	---	---
Fugawee	B	None	---	---	>6.0	---	---
1470*:							
Carioca	B	None	---	---	3.5-6.0	Perched	Feb-Jun
Sibelia Variant	C	None	---	---	2.5-5.0	Perched	Feb-May
Fugawee	B	None	---	---	>6.0	---	---
1480*:							
Macareeno	C	Rare	---	---	2.0-3.5	Perched	Feb-May
Blackwell	D	Occasional	Very brief to brief.	Apr-Jun	0.6-2.5	Apparent	Mar-Jul
Carioca	B	None	---	---	3.5-6.0	Perched	Feb-Jun
1490*:							
Arzo	D	None	---	---	>6.0	---	---
Indiano	C	None	---	---	>6.0	---	---
Barnard	D	None	---	---	>6.0	---	---
1510*:							
Cagle	D	None	---	---	>6.0	---	---
Nosrac	B	None	---	---	>6.0	---	---
Old Camp	D	None	---	---	>6.0	---	---
1520*:							
Duco	D	None	---	---	>6.0	---	---
Smallcone	D	None	---	---	>6.0	---	---
Cagle	D	None	---	---	>6.0	---	---
1521*:							
Duco	D	None	---	---	>6.0	---	---
Yuko	D	None	---	---	>6.0	---	---
Lemm	B	None	---	---	>6.0	---	---
1522*:							
Duco	D	None	---	---	>6.0	---	---
Pahrange	C	None	---	---	>6.0	---	---
Lemm	B	None	---	---	>6.0	---	---
1530*:							
Bombadil	D	None	---	---	>6.0	---	---
Hefed	B	None	---	---	>6.0	---	---
Rubble land.							

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
1531*:							
Bombadil	D	None	---	---	>6.0	---	---
Hefed	B	None	---	---	>6.0	---	---
Fireball	B	None	---	---	>6.0	---	---
1540*:							
McQuarrie	D	None	---	---	>6.0	---	---
Tristan	B	None	---	---	>6.0	---	---
Arzo	D	None	---	---	>6.0	---	---
1541*:							
McQuarrie	D	None	---	---	>6.0	---	---
Duco	D	None	---	---	>6.0	---	---
Tristan	B	None	---	---	>6.0	---	---
1550*:							
Skedaddle	D	None	---	---	>6.0	---	---
Pahrange	C	None	---	---	>6.0	---	---
Lemm	B	None	---	---	>6.0	---	---
1570*:							
Bluewing	A	Occasional	Very brief	Jul-Sep	>6.0	---	---
Biddleman	B	None	---	---	>6.0	---	---
Bundorf	D	None	---	---	>6.0	---	---
1580*:							
Frodo	D	None	---	---	>6.0	---	---
Xman	D	None	---	---	>6.0	---	---
Oppio	D	None	---	---	>6.0	---	---
1590 Ruhe	D	Rare	---	---	>6.0	---	---
1600*:							
Wrango	A	Rare	---	---	>6.0	---	---
Ruhe	D	Rare	---	---	>6.0	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL FEATURES

[The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
101, 102, 106 Aquinas	>60	---	30-40	Thin	Moderate	Moderate	Moderate.
110 Jowec Variant	>60	---	---	---	Moderate	High	Moderate.
111*:							
Jowec Variant	>60	---	---	---	Moderate	High	Moderate.
Greenbrae	>60	---	---	---	Moderate	Moderate	Moderate.
120, 121 Doten	>60	---	---	---	Low	High	High.
130 Greenbrae	>60	---	---	---	Moderate	High	Low.
131, 132 Greenbrae	>60	---	---	---	Moderate	Moderate	Moderate.
134 Greenbrae	>60	---	---	---	Moderate	High	Low.
136 Greenbrae	>60	---	---	---	Moderate	Moderate	Moderate.
140, 141, 142 Haybourne	>60	---	---	---	Moderate	Moderate	Low.
150, 151 Doten Variant	>60	---	---	---	Low	High	High.
160, 161 Incy	>60	---	---	---	Low	Moderate	Low.
171, 172, 173, 174, 175 Indian Creek	>60	---	14-20	Thick	Low	High	Low.
176*:							
Indian Creek	>60	---	14-20	Thick	Low	High	Low.
Reno	40-60	Soft	20-40	Thick	Moderate	High	Low.
Washoe	>60	---	---	---	Moderate	Moderate	Low.
190, 191, 192 Manogue	40-60	Soft	---	---	Low	High	Moderate.
200, 201, 202, 203 Northmore	>60	---	---	---	Low	Moderate	Moderate.
210, 211 Luppino	12-20	Soft	---	---	Moderate	Moderate	Moderate.
221, 222 Oppio	20-40	Hard	---	---	Low	Moderate	Moderate.
223*:							
Oppio	20-40	Hard	---	---	Low	Moderate	Moderate.
Rezave	14-20	Hard	---	---	Low	High	Low.
Rock outcrop.							

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
230 Cradlebaugh	>60	---	---	---	High	High	High.
240, 241 Updike	>60	---	---	---	Low	High	Low.
250, 251, 252 Cassiro	40-65	Soft	---	---	Low	High	Moderate.
260*:							
Acrelane	10-20	Soft	---	---	Moderate	Moderate	Moderate.
Rock outcrop.							
262 Acrelane	10-20	Soft	---	---	Moderate	Moderate	Moderate.
280, 281, 282 Wedekind	10-20	Soft	---	---	Moderate	Moderate	Low.
290, 291 Verdico Variant	20-40	Soft	---	---	Low	High	Low.
300 Surgem	20-30	Hard	---	---	Low	High	Low.
301*, 302*:							
Surgem	20-30	Hard	---	---	Low	High	Low.
Rock outcrop.							
310*, 311*:							
Risley	20-30	Soft	---	---	Low	Moderate	Moderate.
Rock outcrop.							
312 Risley	20-30	Soft	---	---	Low	Moderate	Moderate.
313 Risley	20-40	Soft	---	---	Low	Moderate	Moderate.
314*:							
Risley	20-30	Soft	---	---	Low	Moderate	Moderate.
Xman	10-20	Soft	---	---	Low	High	Low.
Rock outcrop.							
341 Yuko	6-14	Soft	---	---	Moderate	Moderate	Low.
342*:							
Yuko	6-14	Soft	---	---	Moderate	Moderate	Low.
Reywat	10-20	Hard	---	---	Moderate	Moderate	Low.
Rock outcrop.							
350 Mizel	3-10	Hard	---	---	Moderate	Moderate	Moderate.
351*:							
Mizel	3-10	Hard	---	---	Moderate	Moderate	Moderate.
Skedaddle	4-12	Hard	---	---	Moderate	Moderate	Low.
Rock outcrop.							

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
360*. Pits							
370 Lemm	>60	---	---	---	Moderate	Moderate	Low.
390 Duckhill	6-10	Hard	---	---	Moderate	Moderate	Moderate.
391*:							
Duckhill	6-10	Hard	---	---	Moderate	Moderate	Moderate.
Hirschdale	20-40	Soft	---	---	Low	High	Low.
Fraval	20-40	Soft	---	---	Moderate	Moderate	Moderate.
400, 401, 403 Jubilee Variant	>60	---	---	---	High	High	High.
410, 411 Ophir	>60	---	---	---	Moderate	Moderate	Low.
420 Godecke	>60	---	---	---	Moderate	High	High.
423 Godecke Variant	>60	---	40-60	Thin	Moderate	High	Low.
430, 431 Sagouspe Variant	>60	---	---	---	High	Moderate	Low.
440, 441, 442, 443 Jubilee	>60	---	---	---	High	Moderate	Low.
445 Jubilee	>60	---	---	---	Moderate	Moderate	Low.
450 Voltaire	>60	---	---	---	High	High	High.
451, 452 Voltaire	>60	---	---	---	High	High	Moderate.
454 Voltaire	>60	---	---	---	Moderate	High	Low.
455*:							
Voltaire	>60	---	---	---	Moderate	High	Low.
Truckee	>60	---	---	---	High	High	Low.
456 Voltaire	>60	---	---	---	High	High	High.
460, 461 Surprise	>60	---	---	---	Moderate	Moderate	Low.
470 Dalzell	>60	---	20-40	Thin	Moderate	High	High.
480, 482 Holbrook	>60	---	---	---	Moderate	High	Low.
490 Graufels	20-40	Soft	---	---	Low	Moderate	Moderate.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock: Depth	Bedrock: Hardness	Cemented pan: Depth	Cemented pan: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
	In		In				
491*:							
Graufels	20-40	Soft	---	---	Low	Moderate	Moderate.
Rock outcrop.							
492 Graufels	20-40	Soft	---	---	Low	Moderate	Moderate.
493*:							
Graufels	20-40	Soft	---	---	Low	Moderate	Moderate.
Glenbrook	10-20	Soft	---	---	Low	Low	Low.
494 Graufels	20-40	Soft	---	---	Low	Moderate	Moderate.
495*:							
Graufels	20-40	Soft	---	---	Low	Moderate	Moderate.
Glenbrook	10-20	Soft	---	---	Low	Low	Low.
Rock outcrop.							
496*:							
Graufels	20-40	Soft	---	---	Low	Moderate	Moderate.
Glenbrook	10-20	Soft	---	---	Low	Low	Low.
Haypress	40-60	Soft	---	---	Low	Low	Low.
500, 504 Mottsville	>60	---	---	---	Low	Moderate	Moderate.
505 Mottsville	>60	---	---	---	Low	Moderate	Moderate.
510 Settlemeyer	>60	---	---	---	High	High	Low.
513*:							
Settlemeyer	>60	---	---	---	High	High	Low.
Notus	>60	---	---	---	Low	Moderate	Low.
514 Settlemeyer	>60	---	---	---	High	High	Low.
520 Dressler	>60	---	---	---	High	High	Low.
530, 531 Sagouspe	>60	---	---	---	Moderate	High	Moderate.
532 Sagouspe	>60	---	---	---	Moderate	High	Moderate.
550, 551, 553, 554, 557, 559 Leviathan	>60	---	---	---	Moderate	Moderate	Low.
570 Turria	>60	---	---	---	Moderate	Moderate	Low.
585*:							
Barnard	>60	---	20-30	Thick	Moderate	High	Low.
Trosi	>60	---	12-20	Thick	Low	High	Moderate.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
590, 591, 595----------- Springmeyer	>60	---	---	---	Moderate-------	Moderate-------	Low.
600, 601, 602----------- Idlewild	>60	---	---	---	High-----------	High-----------	Low.
612, 613, 614, 615------ Verdico	20-40	Soft	---	---	Low------------	High-----------	Low.
620, 621, 622, 623, 624- Orr	>60	---	---	---	Moderate-------	Moderate-------	Low.
630--------------------- Fleischmann	>60	---	20-30	Thin	Moderate-------	High-----------	Low.
631--------------------- Fleischmann	>60	---	20-30	Thin	Moderate-------	High-----------	Low.
632--------------------- Fleischmann	>60	---	20-30	Thin	Moderate-------	High-----------	Low.
640--------------------- Notus	>60	---	---	---	Low------------	Moderate-------	Low.
650--------------------- Chalco	10-20	Soft	---	---	Low------------	High-----------	Low.
651, 652, 653----------- Chalco	10-20	Soft	---	---	Low------------	High-----------	Low.
654*:							
Chalco------------------	10-20	Soft	---	---	Low------------	High-----------	Low.
Celeton Variant---------	5-15	Soft	---	---	Moderate-------	High-----------	Low.
660, 661, 662, 663, 664, 668, 669--------------- Oest	>60	---	---	---	Moderate-------	Moderate-------	Low.
670, 671, 673, 674------ Galeppi	>60	---	---	---	Moderate-------	Moderate-------	Low.
676*:							
Galeppi-----------------	>60	---	---	---	Moderate-------	Moderate-------	Low.
Barnard-----------------	>60	---	20-30	Thick	Moderate-------	High-----------	Low.
681, 683---------------- Reno	40-60	Soft	20-40	Thick	Moderate-------	High-----------	Low.
730, 731---------------- Stodick	14-20	Soft	---	---	Moderate-------	Moderate-------	Low.
740--------------------- Blackwell	>60	---	---	---	High-----------	Moderate-------	Moderate.
752*, 753*:							
Toiyabe-----------------	10-20	Soft	---	---	Low------------	Moderate-------	Moderate.
Corbett-----------------	24-40	Soft	---	---	Low------------	Moderate-------	Moderate.
Rock outcrop.							
754*:							
Toiyabe-----------------	10-20	Soft	---	---	Low------------	Moderate-------	Moderate.
Rock outcrop.							

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
756*:							
Toiyabe	10-20	Soft	---	---	Low	Moderate	Moderate.
Corbett	24-40	Soft	---	---	Low	Moderate	Moderate.
Haypress	40-60	Soft	---	---	Low	Low	Low.
772, 775 Booford	20-40	Soft	---	---	Moderate	High	Low.
780, 782 Bieber	>60	---	10-20	Thick	Low	High	Low.
800 Truckee	>60	---	---	---	High	High	Low.
802, 805, 806 Truckee	>60	---	---	---	High	High	High.
810, 812, 813 Rose Creek	>60	---	---	---	High	High	Low.
820, 821 Marla	>60	---	---	---	Moderate	High	High.
830, 831 Fettic	>60	---	---	---	High	High	High.
840*:							
Temo	8-20	Soft	---	---	Low	Low	Moderate.
Witefels	20-40	Soft	---	---	Low	Moderate	Moderate.
Rock outcrop.							
850 Washoe	>60	---	---	---	Moderate	Moderate	Low.
861, 862 Reywat	10-20	Hard	---	---	Moderate	Moderate	Low.
863*:							
Reywat	10-20	Hard	---	---	Moderate	Moderate	Low.
Rock outcrop.							
870*:							
Xman	10-20	Soft	---	---	Low	High	Low.
Rock outcrop.							
871, 872 Xman	10-20	Soft	---	---	Low	High	Low.
873*:							
Xman	10-20	Soft	---	---	Low	High	Low.
Rock outcrop.							
875*:							
Xman	10-20	Soft	---	---	Low	High	Low.
Zephan	25-40	Soft	---	---	Low	Moderate	Moderate.
Mizel	3-10	Hard	---	---	Moderate	Moderate	Moderate.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock: Depth	Bedrock: Hardness	Cemented pan: Depth	Cemented pan: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
	In		In				
876*:							
Xman	10-20	Soft	---	---	Low	High	Low.
Oppio	20-40	Hard	---	---	Moderate	High	Moderate.
Old Camp	10-20	Hard	---	---	Moderate	High	Low.
877*:							
Xman	10-20	Soft	---	---	Low	High	Low.
Frodo	18-30	Hard	14-20	Thin	Low	High	Low.
Mizel	3-10	Hard	---	---	Moderate	Moderate	Moderate.
880*:							
Zephan	25-40	Soft	---	---	Low	Moderate	Moderate.
Rock outcrop.							
Smallcone	4-10	Soft	---	---	Low	Moderate	High.
881, 882 Zephan	25-40	Soft	---	---	Low	Moderate	Moderate.
890, 891 Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
892*:							
Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
Koontz	14-20	Soft	---	---	Moderate	Moderate	Low.
Flex	6-12	Soft	---	---	Moderate	Moderate	Low.
893*:							
Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Cagle	20-40	Soft	---	---	Low	High	Low.
894*:							
Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Skedaddle	4-12	Hard	---	---	Moderate	Moderate	Low.
895*:							
Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
Zephan	25-40	Soft	---	---	Low	Moderate	Moderate.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
900, 901, 903 Flex	6-12	Soft	---	---	Moderate	Moderate	Low.
910, 911 Vamp	>60	---	20-40	Thin	High	High	High.
930 Old Camp	10-20	Hard	---	---	Moderate	High	Low.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
931*:							
Old Camp, extremely stony	10-20	Hard	---	---	Moderate	High	Low.
Old Camp, stony	10-20	Hard	---	---	Moderate	High	Low.
Rock outcrop.							
932: Old Camp	10-20	Hard	---	---	Moderate	High	Low.
960, 961, 962, 963: Kayo	>60	---	---	---	Moderate	High	Moderate.
971, 974: Aladshi	>60	---	---	---	Moderate	High	Low.
980, 982: Koontz	14-20	Soft	---	---	Moderate	Moderate	Low.
990*. Rock outcrop							
991*:							
Xeric Torriorthents.							
Urban land.							
992*. Playas							
993*. Haplaquolls							
994*:							
Badland.							
Chalco	10-20	Soft	---	---	Low	High	Low.
Verdico	20-40	Soft	---	---	Low	High	Low.
996*:							
Dune land.							
Playas.							
997*. Badland							
998*. Beaches							
1010: Gabica	10-20	Hard	---	---	Moderate	High	Low.
1040, 1041: Orr Variant	>60	---	---	---	Moderate	High	Moderate.
1050, 1051: Waspo	20-40	Soft	---	---	Low	High	Low.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
1052*:							
Waspo	20-40	Soft	---	---	Low	High	Low.
Rock outcrop.							
1054 Waspo	20-40	Soft	---	---	Low	High	Low.
1060*, 1062*:							
Witefels	20-40	Soft	---	---	Low	Moderate	Moderate.
Rock outcrop.							
1080 Inville Variant	>60	---	---	---	High	Moderate	Moderate.
1090, 1091 Railcity	>60	---	---	---	Low	Moderate	Moderate.
1100*:							
Graylock	40-60	Hard	---	---	Low	High	High.
Temo	8-20	Soft	---	---	Low	Low	Moderate.
Rock outcrop.							
1120, 1121 Apmat	>60	---	---	---	Moderate	Moderate	Moderate.
1130 Dithod	>60	---	---	---	Moderate	High	Moderate.
1141, 1142, 1143 Bedell	>60	---	---	---	Moderate	Low	Moderate.
1160, 1161 Jowec	>60	---	---	---	Low	High	Low.
1170, 1171, 1172 Wedertz	>60	---	---	---	Moderate	Moderate	Moderate.
1181*, 1182*:							
Haypress	40-60	Soft	---	---	Low	Low	Low.
Tanob	20-40	Soft	---	---	Moderate	Low	Moderate.
Rock outcrop.							
1183*:							
Haypress	40-60	Soft	---	---	Low	Low	Low.
Rock outcrop.							
1190, 1191, 1192, 1193, 1194 Spasprey	>60	---	20-30	Thin	Moderate	High	Low.
1200 Mellor	>60	---	---	---	Moderate	High	High.
1210, 1211 Linhart	>60	---	---	---	Low	Moderate	Moderate.
1220 Calpine	>60	---	---	---	Moderate	Low	Moderate.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
1240 Pizene	>60	---	---	---	Low	High	High.
1250, 1251 Rednik	>60	---	---	---	Low	High	Moderate.
1260*:							
Thulepah	>60	---	---	---	Moderate	Moderate	Moderate.
Mosquet	6-20	Hard	---	---	Moderate	Moderate	Low.
1270*:							
Tristan	40-60	Soft	---	---	Moderate	Moderate	Low.
Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
Lemm	>60	---	---	---	Moderate	Moderate	Low.
1271*:							
Tristan	40-60	Soft	---	---	Moderate	Moderate	Low.
Barshaad	20-40	Soft	---	---	Low	High	Low.
Arzo	20-40	Soft	---	---	Low	High	Low.
1272*:							
Tristan	40-60	Soft	---	---	Moderate	Moderate	Low.
Arzo	20-40	Soft	---	---	Low	High	Low.
Reywat	10-20	Hard	---	---	Moderate	Moderate	Low.
1273*:							
Tristan	40-60	Soft	---	---	Moderate	Moderate	Low.
Barshaad	20-40	Soft	---	---	Low	High	Low.
Frodo	18-30	Hard	14-20	Thin	Low	High	Low.
1290 Parran	>60	---	---	---	High	High	High.
1300, 1301 Rose Creek Variant	>60	---	---	---	Moderate	High	High.
1310 Bango	>60	---	---	---	Low	High	Low.
1320*:							
Osobb	9-20	Hard	8-20	Thin	Low	High	Low.
Rezave	14-20	Hard	---	---	Low	High	Low.
Fireball	40-60	Hard	---	---	Low	Moderate	Low.
1330*:							
Sutcliff	>60	---	40-60	Thin	Low	High	Low.
Kleinbush	>60	---	---	---	Low	High	Low.
Washoe	>60	---	---	---	Moderate	Moderate	Low.
1331*:							
Sutcliff	>60	---	40-60	Thin	Low	High	Low.
Bundorf	>60	---	14-20	Thick	Low	High	Low.
Kleinbush	>60	---	---	---	Low	High	Low.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
1340*:							
Hawsley	>60	---	---	---	Low	Low	Low.
Ruhe	14-20	Soft	---	---	Low	High	Low.
Bluewing	>60	---	---	---	Low	High	Moderate.
1341*:							
Isolde	>60	---	---	---	Low	Low	Low.
Dune land.							
1342*:							
Isolde	>60	---	---	---	Low	Low	Low.
Playas.							
1344*:							
Isolde	>60	---	---	---	Low	Low	Low.
Toulon	>60	---	---	---	Low	High	Low.
1345 Hawsley	>60	---	---	---	Low	Low	Low.
1350*:							
Stumble	>60	---	---	---	Low	High	Moderate.
Ruhe	14-20	Soft	---	---	Low	High	Low.
Bluewing	>60	---	---	---	Low	High	Moderate.
1351 Stumble	>60	---	---	---	Low	High	Moderate.
1360*:							
Trocken	>60	---	---	---	Low	High	Low.
Stumble	>60	---	---	---	Low	High	Moderate.
Bluewing	>60	---	---	---	Low	High	Moderate.
1361*:							
Trocken	>60	---	---	---	Low	High	Low.
Ruhe	14-20	Soft	---	---	Low	High	Low.
Bluewing	>60	---	---	---	Low	High	Moderate.
1362*:							
Trocken	>60	---	---	---	Low	High	Low.
Badland.							
1363 Trocken	>60	---	---	---	Low	High	Low.
1364*:							
Trocken	>60	---	---	---	Low	High	Low.
Wrango	>60	---	---	---	Low	High	Moderate.
1370*:							
Singatse	4-10	Hard	---	---	Low	High	Low.
Fireball	40-60	Hard	---	---	Low	Moderate	Low.
Rednik	>60	---	---	---	Low	High	Moderate.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
1371*:							
Singatse	4-10	Hard	---	---	Low	High	Low.
Flex	6-12	Soft	---	---	Moderate	Moderate	Low.
Acrelane	10-20	Soft	---	---	Moderate	Moderate	Moderate.
1372*:							
Singatse	4-10	Hard	---	---	Low	High	Low.
Isolde	>60	---	---	---	Low	Low	Low.
1373*:							
Singatse	4-10	Hard	---	---	Low	High	Low.
Mizel	3-10	Hard	---	---	Moderate	Moderate	Moderate.
Stingdorn	8-20	Hard	8-20	Thin	Low	Moderate	Low.
1374*:							
Singatse	4-10	Hard	---	---	Low	High	Low.
Fireball	40-60	Hard	---	---	Low	Moderate	Low.
Osobb	9-20	Hard	8-20	Thin	Low	High	Low.
1380*:							
Stingdorn	8-20	Hard	8-20	Thin	Low	Moderate	Low.
Singatse	4-10	Hard	---	---	Low	High	Low.
Rock outcrop.							
1390*:							
Pirouette	11-20	Hard	11-20	Thin	Low	High	Low.
Osobb	9-20	Hard	8-20	Thin	Low	High	Low.
Rock outcrop.							
1400*:							
Softscrabble	>60	---	---	---	Moderate	Moderate	Low.
Gabica	10-20	Hard	---	---	Moderate	High	Low.
Burnborough	>60	---	---	---	Moderate	Low	Low.
1401*:							
Softscrabble	>60	---	---	---	Moderate	Moderate	Low.
Gabica	10-20	Hard	---	---	Moderate	High	Low.
Sumine	20-40	Hard	---	---	Moderate	Moderate	Low.
1410*:							
Burnborough	>60	---	---	---	Moderate	Low	Low.
Ticino	20-40	Soft	---	---	Moderate	Low	Moderate.
Gabica	10-20	Hard	---	---	Moderate	High	Low.
1411*:							
Burnborough	>60	---	---	---	Moderate	Low	Low.
Ticino	20-40	Soft	---	---	Moderate	Low	Moderate.
Softscrabble	>60	---	---	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
1420*:							
Barshaad	20-40	Soft	---	---	Low	High	Low.
Fugawee	20-40	Soft	---	---	Moderate	High	High.
Duckhill Variant	4-14	Hard	---	---	Moderate	Moderate	Moderate.
1430*:							
Fraval	20-40	Soft	---	---	Moderate	Moderate	Moderate.
Booford	20-40	Soft	---	---	Moderate	High	Low.
Jumbo	40-60	Soft	---	---	Moderate	Moderate	Moderate.
1431*:							
Fraval	20-40	Soft	---	---	Moderate	Moderate	Moderate.
Hirschdale	20-40	Soft	---	---	Low	High	Low.
Duckhill Variant	4-14	Hard	---	---	Moderate	Moderate	Moderate.
1432*:							
Fraval	20-40	Soft	---	---	Moderate	Moderate	Moderate.
1432*:							
Hirschdale	20-40	Soft	---	---	Low	High	Low.
Jumbo	40-60	Soft	---	---	Moderate	Moderate	Moderate.
1440, 1441 Tallac	>60	---	---	---	Low	Moderate	Moderate.
1450*:							
Meiss	10-20	Hard	---	---	Moderate	Moderate	Moderate.
Sibelia	40-60	Soft	---	---	Low	Low	Low.
Rock outcrop.							
1460*:							
Jorge	60-80	Soft	---	---	Moderate	High	High.
Boomtown	>60	---	---	---	Moderate	Moderate	High.
Fugawee	20-40	Soft	---	---	Moderate	High	High.
1470*:							
Carioca	>60	---	---	---	Moderate	Moderate	Low.
Sibelia Variant	>60	---	---	---	Moderate	Moderate	Moderate.
Fugawee	20-40	Soft	---	---	Moderate	High	High.
1480*:							
Macareeno	>60	---	---	---	High	High	Moderate.
Blackwell	>60	---	---	---	High	Moderate	Moderate.
Carioca	>60	---	---	---	Moderate	Moderate	Low.
1490*:							
Arzo	20-40	Soft	---	---	Low	High	Low.
Indiano	20-40	Hard	---	---	Moderate	Moderate	Low.
Barnard	>60	---	20-30	Thick	Moderate	High	Low.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
1510*:							
Cagle	20-40	Soft	---	---	Low	High	Low.
Nosrac	>60	---	---	---	Moderate	High	Low.
Old Camp	10-20	Hard	---	---	Moderate	High	Low.
1520*:							
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Smallcone	4-10	Soft	---	---	Low	Moderate	High.
Cagle	20-40	Soft	---	---	Low	High	Low.
1521*:							
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Yuko	6-14	Soft	---	---	Moderate	Moderate	Low.
Lemm	>60	---	---	---	Moderate	Moderate	Low.
1522*:							
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Pahrange	20-40	Soft	---	---	Low	Moderate	Low.
1522*:							
Lemm	>60	---	---	---	Moderate	Moderate	Low.
1530*:							
Bombadil	7-14	Hard	---	---	Moderate	High	Low.
Hefed	>60	---	---	---	Low	High	Low.
Rubble land.							
1531*:							
Bombadil	7-14	Hard	---	---	Moderate	High	Low.
Hefed	>60	---	---	---	Low	High	Low.
Fireball	40-60	Hard	---	---	Low	Moderate	Low.
1540*:							
McQuarrie	10-20	Hard	---	---	Moderate	High	Moderate.
Tristan	40-60	Soft	---	---	Moderate	Moderate	Low.
Arzo	20-40	Soft	---	---	Low	High	Low.
1541*:							
McQuarrie	10-20	Hard	---	---	Moderate	High	Moderate.
Duco	10-20	Hard	---	---	Moderate	Moderate	Low.
Tristan	40-60	Soft	---	---	Moderate	Moderate	Low.
1550*:							
Skedaddle	4-12	Hard	---	---	Moderate	Moderate	Low.
Pahrange	20-40	Soft	---	---	Low	Moderate	Low.
Lemm	>60	---	---	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness		Uncoated steel	Concrete
	In		In				
1570*:							
Bluewing	>60	---	---	---	Low	High	Moderate.
Biddleman	>60	---	---	---	Low	High	Low.
Bundorf	>60	---	14-20	Thick	Low	High	Low.
1580*:							
Frodo	18-30	Hard	14-20	Thin	Low	High	Low.
Xman	10-20	Soft	---	---	Low	High	Low.
Oppio	20-40	Hard	---	---	Low	Moderate	Moderate.
1590 Ruhe	14-20	Soft	---	---	Low	High	Low.
1600*:							
Wrango	>60	---	---	---	Low	High	Moderate.
Ruhe	14-20	Soft	---	---	Low	High	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Acrelane	Loamy-skeletal, mixed, mesic, shallow Aridic Argixerolls
Aladshi	Fine-loamy, mixed, mesic Duric Haplargids
Apmat	Loamy-skeletal, mixed, frigid Ultic Argixerolls
Aquinas	Fine-loamy, mixed, mesic Haploxerollic Durargids
Arzo	Fine, montmorillonitic, mesic Aridic Calcic Argixerolls
Bango	Fine-loamy, mixed, mesic Haplic Natrargids
Barnard	Fine, montmorillonitic, mesic Aridic Durixerolls
Barshaad	Fine, montmorillonitic, mesic Aridic Palexerolls
Bedell	Coarse-loamy, mixed, mesic Aridic Argixerolls
Biddleman	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Natrargids
Bieber	Clayey, montmorillonitic, mesic, shallow Aridic Durixerolls
Blackwell	Fine-loamy, mixed Typic Cryaquolls
Bluewing	Sandy-skeletal, mixed, mesic Typic Torriorthents
Bombadil	Loamy, mixed, mesic Lithic Xerollic Haplargids
Booford	Fine, montmorillonitic frigid Typic Argixerolls
Boomtown	Fine, mixed, frigid Ultic Haploxeralfs
Bundorf	Clayey, montmorillonitic, mesic, shallow Typic Durargids
Burnborough	Loamy-skeletal, mixed, frigid Aridic Argixerolls
Cagle	Fine, montmorillonitic, mesic Aridic Argixerolls
Calpine	Coarse-loamy, mixed, mesic Aridic Haploxerolls
Carioca	Loamy-skeletal, mixed Andeptic Cryoboralfs
Cassiro	Clayey-skeletal, montmorillonitic, mesic Aridic Argixerolls
Celeton Variant	Loamy-skeletal, mixed (calcareous), mesic, shallow Typic Torriorthents
Chalco	Clayey, montmorillonitic, mesic, shallow Xerollic Haplargids
Corbett	Mixed, frigid Typic Xeropsamments
Cradlebaugh	Fine-loamy, mixed (calcareous), mesic Duric Haplaquolls
Dalzell	Fine-loamy, mixed, mesic Haploxerollic Nadurargids
Dithod	Fine-loamy, mixed, mesic Fluvaquentic Haploxerolls
Doten	Fine, montmorillonitic, mesic Entic Chromoxererts
Doten Variant	Fine, montmorillonitic, mesic Entic Chromoxererts
Dressler	Coarse-loamy, mixed, mesic Aquic Haploxerolls
Duckhill	Loamy-skeletal, mixed, frigid Lithic Haploxeralfs
Duckhill Variant	Loamy-skeletal, mixed, frigid Lithic Ultic Argixerolls
Duco	Loamy-skeletal, mixed, mesic Lithic Argixerolls
Fettic	Fine-silty, mixed, mesic Aquic Natrixerolls
Fireball	Loamy-skeletal, mixed, mesic Typic Haplargids
Fleischmann	Fine, montmorillonitic, mesic Aridic Durixerolls
Flex	Loamy-skeletal, mixed, mesic, shallow Xerollic Haplargids
Fraval	Loamy-skeletal, mixed, frigid Ultic Argixerolls
Frodo	Clayey, montmorillonitic, mesic, shallow Aridic Durixerolls
Fugawee	Fine-loamy, mixed, frigid Ultic Haploxeralfs
Gabica	Loamy-skeletal, mixed, frigid Lithic Argixerolls
Galeppi	Fine-loamy, mixed, mesic Durargidic Argixerolls
Glenbrook	Mixed, mesic, shallow Xeric Torripsamments
Godecke	Fine-loamy, mixed, mesic Aquic Natrargids
Godecke Variant	Fine-loamy, mixed, mesic Durixerollic Natrargids
Graufels	Sandy, mixed, mesic Torripsammentic Haploxerolls
Graylock	Sandy-skeletal, mixed, Typic Cryorthents
Greenbrae	Fine-loamy, mixed, mesic Xerollic Haplargids
Hawsley	Mixed, mesic Typic Torripsamments
Haybourne	Coarse-loamy, mixed, mesic Xerollic Camborthids
Haypress	Sandy, mixed, frigid Entic Haploxerolls
Hefed	Loamy-skeletal, mixed, mesic Xerollic Haplargids
Hirschdale	Fine, montmorillonitic, frigid Mollic Haploxeralfs
Holbrook	Loamy-skeletal, mixed, mesic Aridic Haploxerolls
Idlewild	Fine, montmorillonitic, mesic Aquic Argixerolls
Incy	Mixed, mesic Xeric Torripsamments
Indian Creek	Clayey, montmorillonitic, mesic, shallow Xerollic Durargids
Indiano	Fine-loamy, mixed, mesic Aridic Argixerolls
Inville Variant	Loamy-skeletal, mixed, frigid Aquultic Haploxeralfs
Isolde	Mixed, mesic Typic Torripsamments
Jorge	Loamy-skeletal, mixed, frigid Ultic Haploxeralfs
Jowec	Fine, montmorillonitic, mesic Xeralfic Paleargids
Jowec Variant	Fine, montmorillonitic, mesic Xerollic Paleargids
Jubilee	Coarse-loamy, mixed, mesic Typic Haplaquolls
Jubilee Variant	Coarse-loamy, mixed (calcareous), mesic Typic Haplaquolls
Jumbo	Loamy-skeletal, mixed, frigid Pachic Ultic Argixerolls
Kayo	Loamy-skeletal, mixed, mesic Xeralfic Haplargids
Kleinbush	Fine, montmorillonitic, mesic Typic Natrargids
Koontz	Loamy-skeletal, mixed, mesic, shallow Aridic Argixerolls
Lemm	Loamy-skeletal, mixed, mesic Aridic Argixerolls

TABLE 17.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Leviathan	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Linhart	Sandy-skeletal, mixed, mesic Torriorthentic Haploxerolls
Luppino	Loamy, mixed, mesic, shallow Aridic Argixerolls
Macareeno	Fine-loamy, mixed Argiaquic Cryoborolls
Manogue	Fine, montmorillonitic, mesic Entic Chromoxererts
Marla	Sandy, mixed Aquic Cryumbrepts
McQuarrie	Loamy, mixed, mesic Lithic Argixerolls
Meiss	Medial Lithic Cryumbrepts
Mellor	Fine-silty, mixed, mesic Xerollic Natrargids
Mizel	Loamy-skeletal, mixed, nonacid, mesic Lithic Torriorthents
Mosquet	Clayey, montmorillonitic Lithic Ruptic-Argic Cryoborolls
Mottsville	Sandy, mixed, mesic Torripsammentic Haploxerolls
Northmore	Fine, montmorillonitic, mesic Aridic Argixerolls
Nosrac	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Notus	Sandy-skeletal, mixed, mesic Aquic Xerofluvents
Oest	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Old Camp	Loamy-skeletal, mixed, mesic Lithic Xerollic Haplargids
Ophir	Sandy, mixed, mesic Typic Haplaquolls
Oppio	Fine, montmorillonitic, mesic Xerollic Haplargids
Orr	Fine-loamy, mixed, mesic Aridic Argixerolls
Orr Variant	Fine-loamy, mixed, mesic Aridic Calcic Argixerolls
Osobb	Loamy-skeletal, mixed, mesic, shallow Typic Durorthids
Pahrange	Fine-loamy, mixed, mesic Aridic Argixerolls
Parran	Fine, montmorillonitic, mesic Typic Salorthids
Pirouette	Loamy-skeletal, mixed, mesic, shallow Typic Nadurargids
Pizene	Fine-loamy, mixed, mesic Typic Natrargids
Railcity	Sandy-skeletal, mixed, frigid Typic Xerorthents
Rednik	Loamy-skeletal, mixed, mesic Typic Haplargids
Reno	Fine, montmorillonitic, mesic Abruptic Xerollic Durargids
Reywat	Loamy-skeletal, mixed, mesic Lithic Argixerolls
Rezave	Clayey, montmorillonitic, mesic Lithic Natrargids
Risley	Fine, montmorillonitic, mesic Xerollic Haplargids
Rose Creek	Coarse-loamy, mixed, mesic Fluvaquentic Haploxerolls
Rose Creek Variant	Coarse-loamy, mixed, mesic Fluventic Camborthids
Ruhe	Mixed, mesic, shallow Typic Torripsamments
Sagouspe	Sandy, mixed, mesic Aquic Xerofluvents
Sagouspe Variant	Sandy, mixed, mesic Aquic Xerofluvents
Settlemeyer	Fine-loamy, mixed, mesic Fluvaquentic Haplaquolls
Sibelia	Loamy-skeletal, mixed Typic Cryumbrepts
Sibelia Variant	Loamy-skeletal, mixed Typic Cryumbrepts
Singatse	Loamy-skeletal, mixed (calcareous), mesic Lithic Torriorthents
Skedaddle	Loamy-skeletal, mixed, nonacid, mesic Lithic Xeric Torriorthents
Smallcone	Loamy-skeletal, mixed, nonacid, mesic Lithic Xeric Torriorthents
Softscrabble	Loamy-skeletal, mixed, frigid Pachic Argixerolls
Spasprey	Fine-loamy, mixed, mesic Haploxerollic Durargids
Springmeyer	Fine-loamy, mixed, mesic Aridic Argixerolls
Stingdorn	Loamy-skeletal, mixed, mesic, shallow Typic Durargids
Stodick	Loamy-skeletal, mixed, mesic, shallow Xerollic Haplargids
Stumble	Mixed, mesic Typic Torripsamments
Sumine	Loamy-skeletal, mixed, frigid Aridic Argixerolls
Surgem	Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids
Surprise	Coarse-loamy, mixed, mesic Aridic Haploxerolls
Sutcliff	Loamy-skeletal, mixed, mesic Typic Haplargids
Tallac	Loamy-skeletal, mixed, frigid Pachic Xerumbrepts
Tanob	Coarse-loamy, mixed, frigid Ultic Argixerolls
Temo	Mixed, shallow Typic Cryopsamments
Thulepah	Fine-loamy, mixed Argic Pachic Cryoborolls
Ticino	Fine-loamy, mixed, frigid Typic Argixerolls
Toiyabe	Mixed, frigid, shallow Typic Xeropsamments
Toulon	Sandy-skeletal, mixed, mesic Typic Camborthids
Tristan	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Trocken	Loamy-skeletal, mixed (calcareous), mesic Typic Torriorthents
Trosi	Clayey-skeletal, montmorillonitic, mesic, shallow Xerollic Durargids
Truckee	Fine-loamy, mixed, mesic Fluvaquentic Haploxerolls
Turria	Fine-loamy, mixed, mesic Xerollic Haplargids
Updike	Fine, montmorillonitic, mesic Typic Natrargids
Vamp	Coarse-loamy, mixed, mesic Aquentic Durorthids
Verdico	Fine, montmorillonitic, mesic Xerollic Paleargids
Verdico Variant	Fine, montmorillonitic, mesic Xerollic Paleargids
Voltaire	Fine-loamy, mixed (calcareous), mesic Fluvaquentic Haplaquolls
Washoe	Loamy-skeletal, mixed, mesic Xerollic Haplargids
Waspo	Fine, montmorillonitic, mesic Entic Chromoxererts

TABLE 17.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Wedekind	Loamy, mixed, mesic, shallow Aridic Argixerolls
Wedertz	Fine-loamy, mixed, mesic Durixerollic Haplargids
Witefels	Mixed Typic Cryopsamments
Wrango	Sandy-skeletal, mixed, mesic Xeric Torriorthents
Xman	Clayey, montmorillonitic, mesic, shallow Xerollic Haplargids
Yuko	Loamy, mixed, mesic, shallow Xerollic Haplargids
Zephan	Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids

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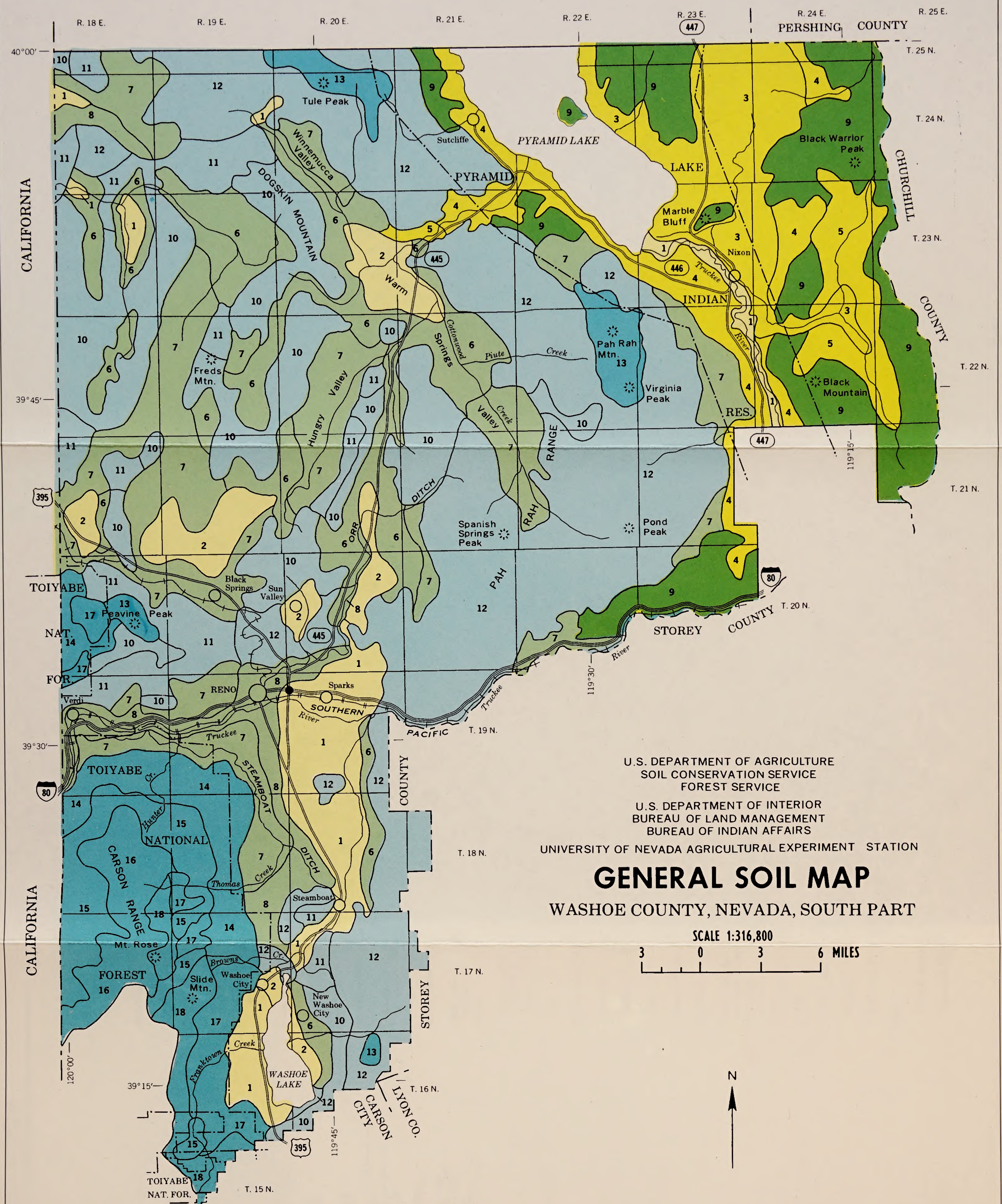

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UNIVERSITY OF NEVADA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

WASHOE COUNTY, NEVADA, SOUTH PART

SCALE 1:316,800

3 0 3 6 MILES

MAP UNITS

AREAS DOMINATED BY SOILS ON FLOOD PLAINS AND LOW TERRACES

1 Truckee-Voltaire-Vamp: Nearly level, very deep and moderately deep, very poorly drained to somewhat poorly drained soils; on alluvial fans, flood plains, and low terraces

2 Mellor-Updike-Godecke: Nearly level, very deep, somewhat poorly drained and moderately well drained soils; on low terraces and low-lying alluvial fans

AREAS DOMINATED BY DRY SOILS ON ALLUVIAL FANS AND TERRACES

3 Isolde-Ruhe-Trocken: Nearly level to moderately steep, shallow and very deep, excessively drained and well drained soils; on sand dunes, lake terraces, and alluvial fans

4 Hawsley-Bluewing-Stumble: Gently sloping to strongly sloping, very deep, excessively drained and somewhat excessively drained soils; on alluvial fans and terraces

5 Bundorf-Sutcliff-Rednik: Moderately sloping to strongly sloping, shallow to very deep, well drained soils; on dissected alluvial fans

AREAS DOMINATED BY PARTIALLY MOIST SOILS ON ALLUVIAL FANS AND TERRACES

6 Haybourne-Wedertz-Mottsville: Nearly level to strongly sloping, very deep, well drained and excessively drained soils; on alluvial fans and terraces

7 Reno-Galeppi-Chalco: Gently sloping to steep, shallow to very deep, well drained soils; on dissected alluvial fans, terraces, and pediments

8 Oest-Orr-Leviathan: Nearly level to steep, very deep, well drained soils; on alluvial fans and terraces

AREAS DOMINATED BY DRY SOILS ON FOOTHILLS AND LOW HILLS

9 Osobb-Singatse-Fireball: Strongly sloping to steep, very shallow to deep, well drained and somewhat excessively drained soils; on uplands

AREAS DOMINATED BY PARTIALLY MOIST SOILS ON FOOTHILLS AND LOW HILLS

10 Acrelane-Graufels-Glenbrook: Moderately sloping to very steep, shallow and moderately deep, well drained and somewhat excessively drained soils; on granitic uplands

11 Indiano-Flex-Koontz: Strongly sloping to steep, very shallow to moderately deep, well drained soils; on uplands

12 Xman-Duco-Old Camp: Moderately sloping to steep, shallow, well drained soils; on uplands

AREAS DOMINATED BY SOILS ON HIGH MOUNTAINS

13 Softscrabble-Gabica-Sumine: Strongly sloping to steep, shallow to very deep, well drained soils; on uplands

14 Fraval-Booford-Jumbo: Strongly sloping to steep, moderately deep and deep, well drained soils; on mountainous uplands

15 Tallac-Fugawee-Jorge: Moderately sloping to steep, moderately deep to very deep, well drained soils; on mountain slopes and moraines

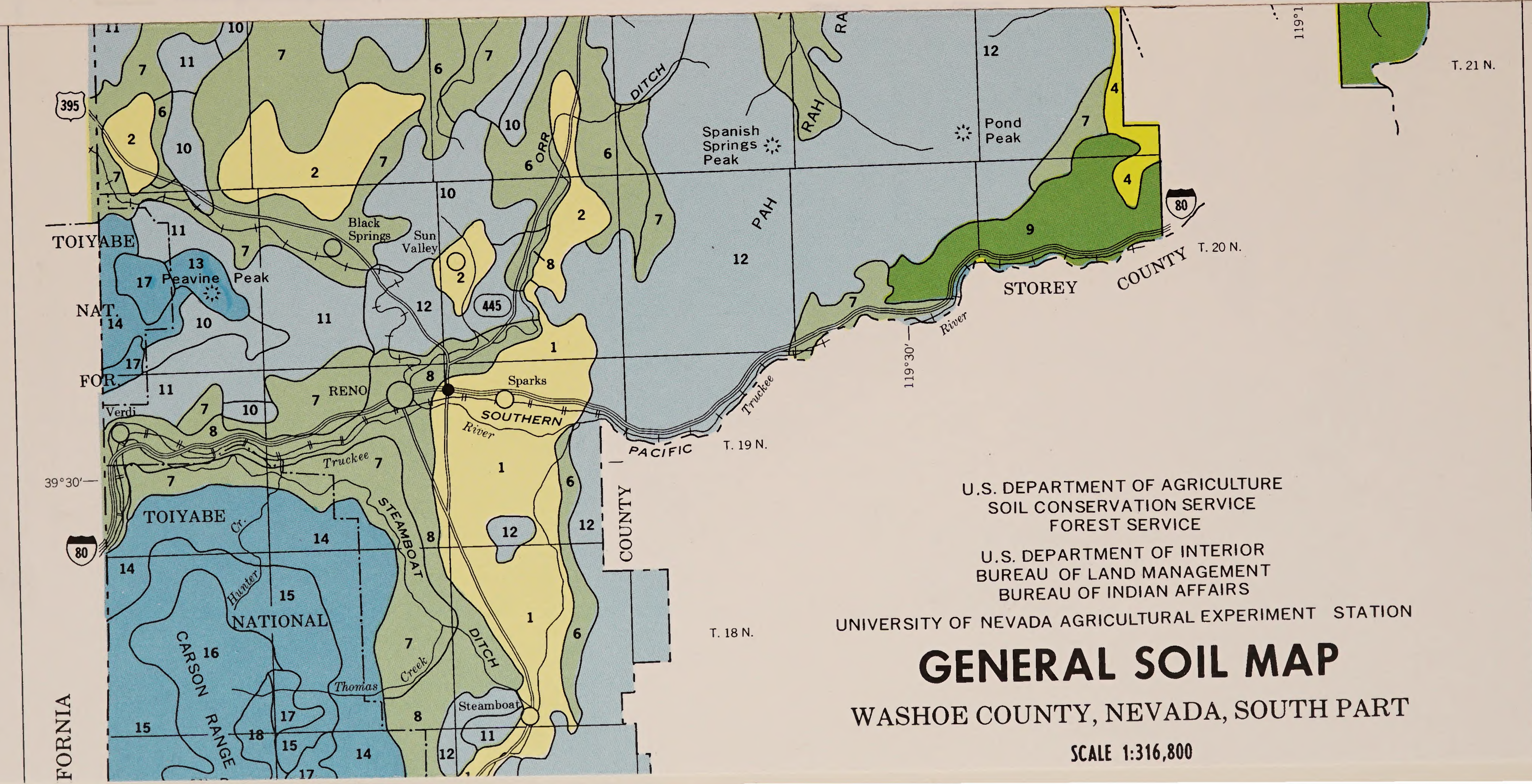
16 Meiss-Sibelia-Rock outcrop: Moderately steep to steep, shallow and deep, well drained to excessively drained cold soils and Rock outcrop; on uplands

17 Corbett-Toiyabe-Rock outcrop: Moderately steep to very steep, shallow and moderately deep, somewhat excessively drained and excessively drained soils and Rock outcrop; on mountainous granitic uplands

18 Temo-Witefels-Rock outcrop: Moderately steep to very steep, shallow and moderately deep, somewhat excessively drained and excessively drained cold soils and Rock outcrop; on mountainous and granitic uplands

Compiled 1982

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



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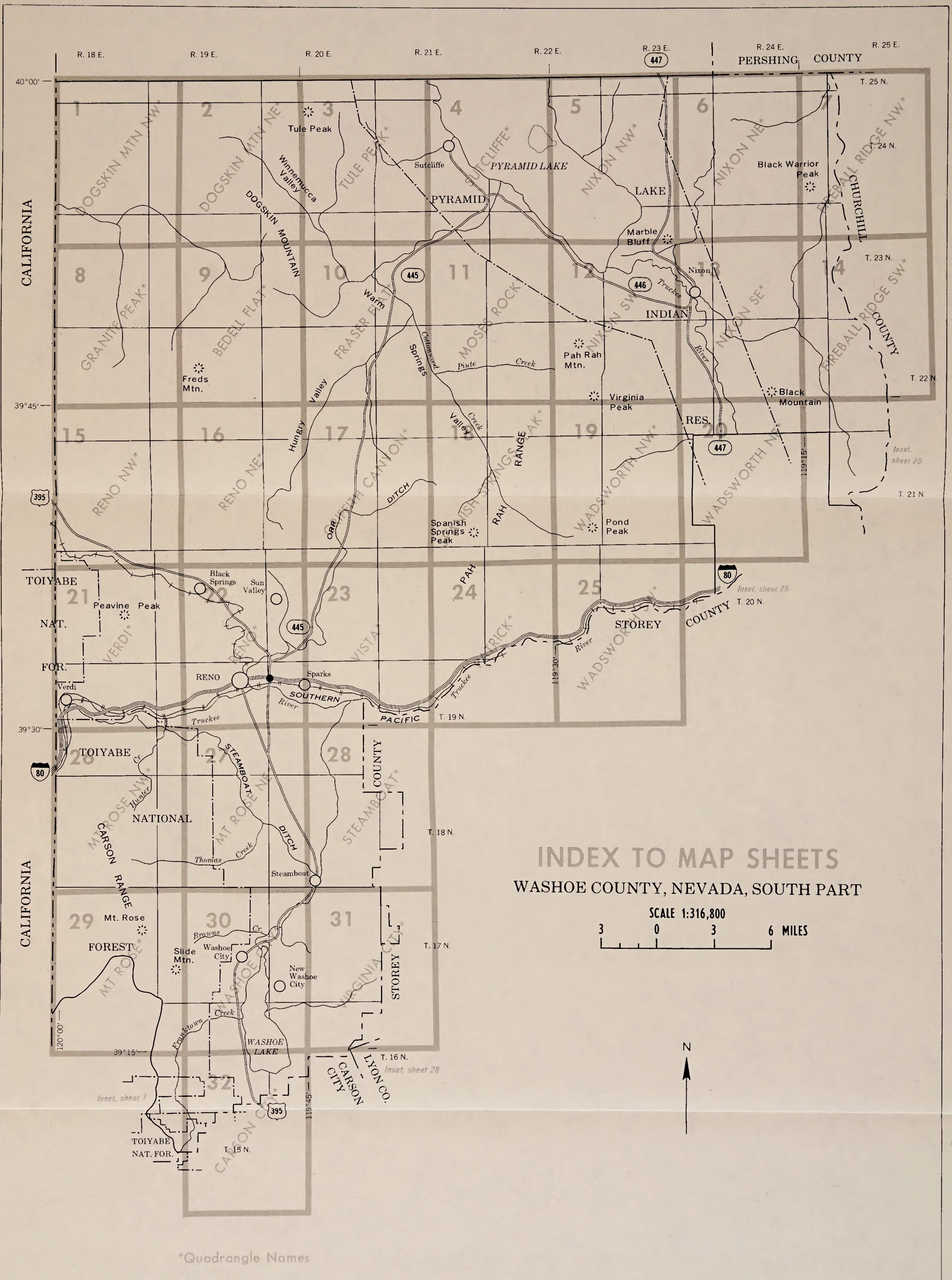
WASHOE COUNTY, NEVADA, SOUTH PART

SCALE 1:316,800



INDEX TO MAP SHEETS

WASHOE COUNTY, NEVADA, SOUTH PART

SCALE 1:316,800

3 0 3 6 MILES

*Quadrangle Names

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE

U.S. DEPARTMENT OF INTERIOR BUREAU OF LAND MANAGEMENT
BUREAU OF INDIAN AFFAIRS
UNIVERSITY OF NEVADA AGRICULTURAL EXPERIMENT STATION

WASHOE COUNTY, NEVADA

SOIL LEGEND

SYMBOL Narrowly Defined	SYMBOL Broadly Defined	NAME
101		Aquinas sandy loam, 4 to 8 percent slopes
102		Aquinas sandy loam, 8 to 15 percent slopes
106		Aquinas sandy loam, 8 to 15 percent slopes, eroded
110		Jowec Variant sandy loam, 4 to 8 percent slopes
111		Jowec Variant-Greenbrae sandy loams, 4 to 15 percent slopes
120		Doten silty clay, 0 to 2 percent slopes
121		Doten silty clay, 8 to 15 percent slopes
130		Greenbrae sandy loam, clayey substratum, 0 to 2 percent slopes
131		Greenbrae sandy loam, 0 to 2 percent slopes
132		Greenbrae sandy loam, 2 to 4 percent slopes
134		Greenbrae sandy loam, clayey substratum, 4 to 8 percent slopes
136		Greenbrae sandy loam, 4 to 8 percent slopes
140		Haybourne loamy sand, 2 to 4 percent slopes
141		Haybourne loamy sand, 4 to 8 percent slopes
142		Haybourne loamy sand, 8 to 15 percent slopes
150		Doten Variant silty clay, slightly saline
151		Doten Variant silty clay, strongly saline
160		Incy sand, 4 to 8 percent slopes
161		Incy fine sand, hilly
171		Indian Creek gravelly sandy loam, 0 to 4 percent slopes
172		Indian Creek sandy loam, 4 to 8 percent slopes
173		Indian Creek sandy loam, 8 to 15 percent slopes
174		Indian Creek extremely stony sandy loam, 2 to 8 percent slopes
175		Indian Creek very cobbly loam, 4 to 8 percent slopes
	176	Indian Creek-Reno-Washoe association
190		Manogue cobbly clay, 2 to 8 percent slopes
191		Manogue cobbly clay, 8 to 15 percent slopes
192		Manogue cobbly clay, 15 to 30 percent slopes
200		Northmore sandy loam, 0 to 2 percent slopes
201		Northmore sandy loam, 2 to 4 percent slopes
202		Northmore sandy loam, 4 to 8 percent slopes
203		Northmore sandy loam, 8 to 15 percent slopes
210		Luppino gravelly sandy loam, 4 to 8 percent slopes
211		Luppino gravelly sandy loam, 8 to 15 percent slopes
221		Oppio cobbly sandy loam, 8 to 15 percent slopes
222		Oppio cobbly sandy loam, 15 to 30 percent slopes
	223	Oppio-Rezave-Rock outcrop association
230		Cradlebaugh loam
240		Updike loam
241		Updike loam, gravelly substratum
250		Cassiro gravelly sandy loam, 2 to 4 percent slopes
251		Cassiro gravelly sandy loam, 4 to 8 percent slopes
252		Cassiro gravelly sandy loam, 8 to 15 percent slopes
260		Acrelane-Rock outcrop complex, 15 to 50 percent slopes
262		Acrelane very stony sandy loam, 8 to 15 percent slopes
280		Wedekind gravelly loam, 8 to 15 percent slopes
281		Wedekind gravelly loam, 15 to 30 percent slopes
282		Wedekind gravelly sandy loam, 30 to 50 percent slopes
290		Verdico Variant stony sandy loam, 8 to 15 percent slopes
291		Verdico Variant very stony sandy loam, 15 to 30 percent slopes
300		Surgem stony sandy loam, 8 to 15 percent slopes
301		Surgem-Rock outcrop complex, 15 to 30 percent slopes
302		Surgem-Rock outcrop complex, 30 to 50 percent slopes
310		Risley-Rock outcrop complex, 8 to 15 percent slopes
311		Risley-Rock outcrop complex, 15 to 30 percent slopes
312		Risley cobbly loam, 15 to 30 percent slopes
313		Risley cobbly clay loam, 8 to 15 percent slopes
	314	Risley-Xman-Rock outcrop association
341		Yuko stony loam, 15 to 30 percent slopes
342		Yuko-Reywat-Rock outcrop association
350		Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes
	351	Mizel-Skedaddle-Rock outcrop association
360		Pits
370		Lemm very gravelly coarse sandy loam, 4 to 8 percent slopes
390		Duckhill stony loam, 30 to 50 percent slopes
	391	Duckhill-Hirschdale-Fraval association
400		Jubilee Variant loamy sand, strongly saline
401		Jubilee Variant loamy sand, slightly saline
403		Jubilee Variant loam, slightly saline
410		Ophir loamy sand, 2 to 8 percent slopes
411		Ophir loamy sand, 0 to 2 percent slopes
420		Godecke loamy sand
423		Godecke Variant loamy sand
430		Sagouspe Variant loamy very fine sand
431		Sagouspe Variant loamy very fine sand, wet
440		Jubilee sandy loam
441		Jubilee clay loam
442		Jubilee gravelly sand
443		Jubilee loamy sand
445		Jubilee sandy loam, drained
450		Voltaire loam
451		Voltaire loam, slightly saline
452		Voltaire loam, strongly saline
454		Voltaire silty clay, drained
455		Voltaire-Truckee complex, drained
456		Voltaire clay loam, gravelly substratum
460		Surprise loamy sand, 2 to 4 percent slopes
461		Surprise coarse sandy loam, 4 to 8 percent slopes
470		Dalzell loamy fine sand
480		Holbrook gravelly loamy sand, 2 to 8 percent slopes
482		Holbrook cobbly loamy sand, 2 to 8 percent slopes
490		Graufels bouldery sand, 8 to 15 percent slopes
491		Graufels-Rock outcrop complex, 15 to 30 percent slopes
492		Graufels bouldery sand, 15 to 30 percent slopes
493		Graufels-Glenbrook complex, 8 to 50 percent slopes
494		Graufels gravelly loamy coarse sand, 4 to 8 percent slopes
495		Graufels-Glenbrook-Rock outcrop complex, 4 to 15 percent slopes
	496	Graufels-Glenbrook-Haypress association
500		Mottsville sand, 0 to 4 percent slopes
504		Mottsville sand, 8 to 15 percent slopes
505		Mottsville gravelly coarse sand, 4 to 8 percent slopes
510		Settlemeyer fine sandy loam, 0 to 2 percent slopes
513		Settlemeyer-Notus complex
514		Settlemeyer gravelly loam, 2 to 4 percent slopes
520		Dressler loamy snad, 2 to 4 percent slopes
530		Sagouspe sand
531		Sagouspe fine sandy loam
532		Sagouspe gravelly sand, gravelly substratum
550		Leviathan stony sandy loam, 0 to 2 percent slopes
551		Leviathan stony sandy loam, 2 to 8 percent slopes
553		Leviathan stony sandy loam, 16 to 30 percent slopes
554		Leviathan very stony sandy loam, 2 to 8 percent slopes
557		Leviathan very stony sandy loam, 30 to 50 percent slopes
559		Leviathan extremely stony sandy loam, 2 to 8 percent slopes
570		Turria loam
	585	Barnard-Trosi association
590		Springmeyer stony loam, 0 to 2 percent slopes
591		Springmeyer stony loam, 2 to 4 percent slopes
595		Springmeyer sandy clay loam, 0 to 2 percent slopes
600		Idlewild clay loam, drained
601		Idlewild sandy loam, drained
602		Idlewild gravelly sandy loam
612		Verdico very stony sandy loam, 4 to 8 percent slopes
613		Verdico extremely stony sandy loam, 8 to 15 percent slopes
614		Verdico extremely stony sandy loam, 15 to 30 percent slopes
615		Verdico sandy loam, 4 to 8 percent slopes
620		Orr stony sandy loam, 2 to 4 percent slopes
621		Orr stony sandy loam, 4 to 8 percent slopes
622		Orr stony sandy loam, gravelly substratum, 2 to 4 percent slopes
623		Orr sandy loam, 0 to 2 percent slopes
624		Orr gravelly sandy loam, 0 to 2 percent slopes
630		Fleischmann gravelly clay loam, 2 to 4 percent slopes
631		Fleischmann gravelly clay loam, 4 to 8 percent slopes
632		Fleischmann loam, 8 to 15 percent slopes
640		Notus stony loamy fine sand
650		Chalco very stony clay loam, 15 to 30 percent slopes
651		Chalco very stony clay loam, 30 to 50 percent slopes
652		Chalco stony loam, 4 to 8 percent slopes
653		Chalco cobbly sandy loam, 8 to 15 percent slopes
654		Chalco-Celeton Variant complex, 2 to 8 percent slopes
660		Oest very bouldery sandy loam, 2 to 8 percent slopes
661		Oest bouldery sandy loam, 2 to 8 percent slopes
662		Oest extremely stony sandy loam, 2 to 8 percent slopes
663		Oest very gravelly loam, 15 to 30 percent slopes
664		Oest very gravelly loam, 8 to 15 percent slopes
668		Oest very bouldery sandy loam, 30 to 50 percent slopes
669		Oest gravelly sandy loam, 0 to 2 percent slopes
670		Galeppi sandy loam, 4 to 8 percent slopes
671		Galeppi sandy loam, 8 to 15 percent slopes
673		Galeppi sandy loam, 15 to 30 percent slopes
674		Galeppi stony sandy loam, 8 to 15 percent slopes
676		Galeppi-Barnard association
681		Reno very stony fine sandy loam, 8 to 15 percent slopes
683		Reno stony sandy loam, 2 to 8 percent slopes
730		Stodick very stony loam, 15 to 30 percent slopes
731		Stodick stony loam, 30 to 50 percent slopes
740		Blackwell sandy loam
752		Toiyabe-Corbett-Rock outcrop association, moderately steep
753		Toiyabe-Corbett-Rock outcrop association, steep
754		Toiyabe-Rock outcrop complex, 50 to 70 percent slopes
	756	Toiyabe-Corbett-Haypress association
772		Booford very stony sandy loam, 8 to 15 percent slopes
775		Booford very stony loam, 30 to 50 percent slopes
780		Bieber stony sandy loam, 0 to 4 percent slopes
782		Bieber stony sandy loam, 8 to 15 percent slopes
800		Truckee silt loam
802		Truckee silt loam, strongly saline
805		Truckee sandy loam, gravelly substratum
806		Truckee sandy loam, sandy substratum, strongly saline
810		Rose Creek fine sandy loam, drained
812		Rose Creek loamy fine sand, drained
813		Rose Creek gravelly fine sandy loam, drained
820		Marla loamy sand, 4 to 8 percent slopes
821		Marla loamy sand, 0 to 4 percent slopes
830		Fettic silty clay loam
831		Fettic loam
840		Temo-Witefels-Rock outcrop association
850		Washoe gravelly sandy loam, 0 to 4 percent slopes
861		Reywat extremely stony loam, 15 to 30 percent slopes
862		Reywat very cobbly sandy loam, 8 to 15 percent slopes
863		Reywat-Rock outcrop complex, 15 to 50 percent slopes
870		Xman-Rock outcrop complex, 4 to 15 percent slopes
871		Xman very stony loam, 15 to 30 percent slopes
872		Xman very stony sandy loam, 8 to 15 percent slopes
873		Xman-Rock outcrop complex, 30 to 50 percent slopes
	875	Xman-Zephan-Mizel association
	876	Xman-Oppio-Old Camp association
	877	Xman-Frodo-Mizel association
880		Zephan-Rock outcrop-Smallcone complex, 15 to 50 percent slopes
881		Zephan very gravelly sandy loam, 30 to 50 percent slopes
882		Zephan stony sandy loam, 15 to 30 percent slopes
890		Indiano gravelly loam, warm, 15 to 30 percent slopes
891		Indiano gravelly loam, warm, 30 to 50 percent slopes
	892	Indiano-Koontz-Flex association
	893	Indiano-Duco-Cagle association
	894	Indiano-Duco-Skedaddle association
	895	Indiano-Zephan-Duco association
900		Flex very gravelly sandy loam, 15 to 30 percent slopes
901		Flex very gravelly sandy loam, 30 to 50 percent slopes
903		Flex stony sandy loam, 8 to 15 percent slopes
910		Vamp fine sandy loam, slightly saline-alkali
911		Vamp silt loam, strongly saline-alkali
930		Old Camp stony sandy loam, 15 to 30 percent slopes
931		Old Camp-Rock outcrop complex, 15 to 50 percent slopes
932		Old Camp stony sandy loam, 8 to 15 percent slopes
960		Kayo stony sandy loam, 2 to 4 percent slopes
961		Kayo stony sandy loam, 4 to 8 percent slopes
962		Kayo very stony sandy loam, 4 to 8 percent slopes
963		Kayo very stony sandy loam, 15 to 30 percent slopes
971		Aladshi sandy loam, 2 to 4 percent slopes
974		Aladshi gravelly sandy loam, 4 to 8 percent slopes
980		Koontz gravelly loam, 8 to 15 percent slopes
982		Koontz stony loam, 15 to 30 percent slopes
990		Rock outcrop
991		Xeric Torriorthents-Urban land complex
992		Playas
993		Haplaquolls, nearly level
994		Badland-Chalco-Verdico complex, 8 to 30 percent slopes
	996	Dune land-Playas complex
997		Badland
998		Beaches
1010		Gabica very gravelly sandy loam, 8 to 30 percent slopes
1040		Orr Variant gravelly sandy loam
1041		Orr Variant coarse sandy loam, thin surface
1050		Waspo clay, 15 to 30 percent slopes
1051		Waspo stony clay, 30 to 50 percent slopes
1052		Waspo-Rock outcrop complex, 30 to 50 percent slopes
1054		Waspo gravelly clay, 2 to 8 percent slopes
1060		Witefels-Rock outcrop complex, 15 to 30 percent slopes
1062		Witefels-Rock outcrop complex, 50 to 70 percent slopes
1080		Inville Variant gravelly sandy loam, 2 to 8 percent slopes
1090		Railcity very bouldery coarse sand, 15 to 50 percent slopes
1091		Railcity very bouldery coarse sand, 8 to 15 percent slopes
1100		Graylock-Temo-Rock outcrop complex, 30 to 70 percent slopes
1120		Apmat very stony coarse sand, 2 to 8 percent slopes
1121		Apmat gravelly sandy loam, 2 to 8 percent slopes
1130		Dithod sandy loam
1141		Bedell loamy sand, 2 to 4 percent slopes
1142		Bedell loamy sand, 4 to 8 percent slopes
1143		Bedell loamy sand, 8 to 15 percent slopes
1160		Jowec silty clay loam
1161		Jowec sandy loam
1170		Wedertz sandy loam, 2 to 4 percent slopes
1171		Wedertz sandy loam, 4 to 8 percent slopes
1172		Wedertz sand, 2 to 4 percent slopes
1181		Haypress-Tanob-Rock outcrop complex, 15 to 50 percent slopes
	1182	Haypress-Tanob-Rock outcrop association
	1183	Haypress-Rock outcrop complex, 15 to 50 percent slopes
1190		Spasprey sandy loam, 0 to 2 percent slopes
1191		Spasprey sandy loam, 2 to 4 percent slopes
1192		Spasprey sand, 2 to 4 percent slopes
1193		Spasprey sandy loam, 4 to 8 percent slopes
1194		Spasprey stony sandy loam, 4 to 8 percent slopes
1200		Mellor silt loam
1210		Linhart stony coarse sand, 4 to 8 percent slopes
1211		Linhart stony coarse sand, 15 to 30 percent slopes
1220		Calpine coarse sandy loam, 4 to 8 percent slopes
1240		Pizene sandy loam, 0 to 4 percent slopes
1250		Rednik very gravelly sandy loam, 4 to 8 percent slopes
1251		Rednik very stony sandy loam, 8 to 15 percent slopes
	1260	Thulepah-Mosquet association
	1270	Tristan-Indiano-Lemm association
	1271	Tristan-Barshaad-Arzo association
	1272	Tristan-Arzo-Reywat association
	1273	Tristan-Barshaad-Frodo association
1290		Parran silty clay loam, rarely flooded
1300		Rose Creek Variant sandy loam
1301		Rose Creek Variant loamy fine sand
	1310	Bango gravelly sandy loam, 0 to 8 percent slopes
	1320	Osobb-Rezave-Fireball association
	1330	Sutcliff-Kleinbush-Washoe association
	1331	Sutcliff-Bundorf-Kleinbush association
	1340	Hawsley-Ruhe-Bluewing association
	1341	Isolde-Dune land complex, hilly
	1342	Isolde-Playas association
	1344	Isolde-Toulon complex, 0 to 15 percent slopes
1345		Hawsley sand, 2 to 8 percent slopes
	1350	Stumble-Ruhe-Bluewing association
1351		Stumble loamy sand, 4 to 8 percent slopes
	1360	Trocken-Stumble-Bluewing association
	1361	Trocken-Ruhe-Bluewing association
	1362	Trocken-Badland complex, 4 to 15 percent slopes
	1363	Trocken very stony sandy loam, 4 to 8 percent slopes
	1364	Trocken-Wrango complex, 4 to 30 percent slopes
	1370	Singatse-Fireball-Rednik association
	1371	Singatse-Flex-Acrelane association
	1372	Singatse-Isolde association
	1373	Singatse-Mizel-Stingdorn association
	1374	Singatse-Fireball-Osobb association
	1380	Stingdorn-Singatse-Rock outcrop association
	1390	Pirouette-Osobb-Rock outcrop association
	1400	Softscrabble-Gabica-Burnborough association
	1401	Softscrabble-Gabica-Sumine association
	1410	Burnborough-Ticino-Gabica association
	1411	Burnborough-Ticino-Softscrabble association
	1420	Barshaad-Fugawee-Duckhill Variant association
	1430	Fraval-Booford-Jumbo association
	1431	Fraval-Hirschdale-Duckhill Variant association
	1432	Fraval-Hirschdale-Jumbo association
	1440	Tallac very bouldery sandy loam, 4 to 30 percent slopes
	1441	Tallac stony sandy loam, 30 to 50 percent slopes
	1450	Meiss-Sibelia-Rock outcrop association
	1460	Jorge-Boomtown-Fugawee association
	1470	Carioca-Sibelia Variant-Fugawee association
	1480	Macareeno-Blackwell-Carioca association
	1490	Arzo-Indiano-Barnard association
	1510	Cagle-Nosrac-Old Camp association
	1520	Duco-Smallcone-Cagle association
	1521	Duco-Yuko-Lemm association
	1522	Duco-Pahrange-Lemm association
	1530	Bombadil-Hefed-Rubble land association
	1531	Bombadil-Hefed-Fireball association
	1540	McQuarrie-Tristan-Arzo association
	1541	McQuarrie-Duco-Tristan association
	1550	Skedaddle-Pahrange-Lemm association
	1570	Bluewing-Biddleman-Bundorf association
	1580	Frodo-Xman-Oppio association
	1590	Ruhe stony loamy sand, 4 to 8 percent slopes
	1600	Wrango-Ruhe complex, 4 to 8 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- Gravel pit — G.P.
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — SvE 107

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) — S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot